Pit and Quarry

With which is consolidated CEMENT-MILL & QUARRY

Member Audit Bureau of Circulations

Read in Largest Number of Plants

Published Biweekly on Wednesday for Producers and Manufacturers of Sand, Gravel, Stone, Cement, Gypsum, Lime, and Other Non-Metallic Minerals.

Subscription price: $5 for 3 years, $2 for 1 year in the United States and possessions, North, Central and South America; elsewhere $1 additional for each year. Single copies 20c.

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Executives Named in Huge Granite Merger

TEN VERMONT PLANTS INVOLVED

Organization of the various departments of the Rock of Ages Corporation of Vermont, following the completion of a $6,000,000 merger of quarries and plants in February, is proceeding steadily. Officers of the corporation have accomplished much in the way of establishing the administrative departments at the main office in Graniteville, Vt. Likewise, the managements of ten manufacturing plants which are a part of the consolidation are now nearly complete in organization.

The manager of plant production, George Straiton, with Alex. D. Straiton, assistant manager, have been active in co-ordinating operations in the finishing end of the business and working with them in managerial capacities are the following: William Barclay, manager of the Barclay, Vt., plant; William Milne, manager of the William Milne Granite Co. plant; George Halvosa, manager of the Straiton plant; F. A. Grearson, manager of the Grearson & Lane plant; J. A. Healy, manager of the Canton plant; George Seivwright, manager of the Eureka plant at Montpelier, Vt.; William Stephen, manager of the Lawrence plant, Montpelier, and Robert B. Perry, manager of the Perry plant in Waterbury, Vt.

Extensive alterations and additions have been made in the Rock of Ages offices at Graniteville, Vt., and as rapidly as other departments are organized it is expected that additional office room will be required.

Pennsylvania Sand Firm Buys Two Steel Barges

Two large steel barges have been purchased by the Oil City Sand & Gravel Co. of Oil City, Pa., to augment the equipment in use in its dredging operations. The barges were purchased from the Dravo Construction Co. of Pittsburgh at a cost of approximately $14,000. They are 100 ft. in length and 26 ft. in width. Purchase of the barges is part of an expansion program inaugurated by the company several weeks ago and which involves an expenditure of approximately $30,000. The program, in addition to the purchase of the new steel barges, includes the decking of wooden barges now in use and construction of additional docking facilities at the plant site. This work is now nearing completion.

To Erect New Crushing Plant at Rock Hill, Mo.

During the coming fall the Rock Hill Supply Co., which is owned by the Columbia Quarry Co. of St. Louis, will erect a crushed-stone plant at Rock Hill, Mo. The company owns a 36-acre tract on the Missouri Pacific Ry. at the city limits of St. Louis, 12 miles from the down-town section. The plant will be designed to produce 1,200 tons daily.

Derailed Freight Train Wrecks Plant Buildings

Several plant buildings of the Wolverine Portland Cement Co., at Coldwater, Mich., were demolished recently when a freight train was derailed as the result of a broken drawbar. In jumping the track the train crashed into the buildings which were located close by. The train crew and occupants of the buildings escaped injury.

British Columbia Firm to Operate New plant

Marking its most important expansion project in years, the firm of Gilley Brothers, Ltd., of New Westminster, B. C., Canada, is preparing to open a new gravel pit and plant on a deposit of 350 acres near Port Coquitlam. Considerable new equipment is to be installed and production schedules are expected to start in about two months, according to reports. The company's present plant on the Pitt River was recently rebuilt and is now in operation.

Gas Tax to Bring in Nearly Half Billion

SEVERAL STATES SEEK INCREASE

The nation's gasoline tax bill for 1930 will total $550,000,000, an increase of approximately $100,000,000 over the 1929 bills, according to preliminary estimates.

Actual collections last year were $449,731,000. The increase in the 1930 collections is based almost entirely on an expected gain in gasoline consumption.

The total takes into consideration the increased tax rate in Oregon, which moved into the 4-cent bracket on Jan. 1.

It does not include actual or expected rate increases in other states, however, nor the recent increase in Idaho, which raised the tax to 5 cents from 4 cents per gallon.

Legislation seeking higher rates is pending in Mississippi, New York, New Jersey and Texas and there is agitation for increases in Massachusetts, North Dakota, Kansas, Louisiana and others.

Only Missouri, where the rate legally is fixed at 2 cents for a decade, and California, whose state officials from the government down publicly have declared the revenues sufficient for present and contemplated highway programs, have displayed no tendency to seek higher taxes.

Marble and Lime Plant May Fire Another Kiln

The offices of the Black Marble & Lime Co., have been removed from Enterprise, Ore., to La Grande, Ore. The company's plant at Enterprise is operating at capacity and a new kiln is to be fired shortly.

Oregon Stone Quarries Swing Into Production

With 100 men employed, the crushed stone quarries of Hauser Construction Co., of Marshfield, Ore., recently began operating. Much of the material to be produced this season will be used for jetty construction on the Coos River.

Building Permits in March Show Increase

UP 46 PER CENT OVER FEBRUARY

According to statistics collected by S. W. Straus & Co., building construction throughout the United States has taken a definite turn for the better. Building permits issued during March, 1930, in 583 representative cities and towns in every part of the country totaled $187,270,891 compared with $128,043,217 in February, a gain of 46 per cent.

Building permits for March, 1929, amounted to $408,931,092, which at first glance would appear to indicate a drastic decline in building activity this year amounting to 54 per cent. Had March, 1929, been a normal month in the building industry, this decline would preclude any possibility of an encouraging interpretation of the figures. However, it should be remembered that during March of last year an abnormal volume of building plans, more than $170,000,000, was rushed through and filed in the city of New York because of the pending multiple-dwellings legislation at Albany.

The significance of the 46 per cent increase in March over February lies in the fact that the normal expected increase from February to March is only about 37 per cent. The March increase further compares favorably with a loss of 2 per cent from January to February; 17 per cent from December to January; 19 per cent from November to December, and 23 per cent from October to November. The reports constitute the most reassuring indication so far received that the building trend has turned the corner and is headed upward.

In the group of 25 cities in which the greatest building activities currently exist March permits were $109,056,842 as compared with $66,156,153 in February—a gain of 65 per cent. The loss from March, 1929, was 60 per cent, but again the abnormal conditions prevailing in New York City last year must be taken into consideration.

Los Angeles ranked second to New York in building volume with $7,045,931, followed by Philadelphia, Cincinnati, Detroit and Chicago in the order named. Permits in San Francisco amounted to $3,502,312, compared with $2,701,111 in March, 1929. Boston declined from March of last year but gained over February. Pittsburgh also gained over February, but showed a loss from March, 1929.

Building-material prices were generally firm in March with increases reported for several important items, such as Portland cement, brick and hollow tile, lime, sand and gravel, cast-iron pipe and sewer pipe.

Fire Causes Damage at Michigan Gravel Plant

Fire recently visited the Grand Haven, Mich., gravel plant of the Construction Materials Corp., causing $6,000 damage. The cause of the blaze was unknown. Two electric motors were totally destroyed and a long conveyor belt was badly damaged. The barge *Fontana* was drawn up at the company's dock at the time and was being loaded and for a time the flames threatened to damage it also. Local firemen kept the blaze under control, however.

Lime Products Plant to Operate Again Shortly

After lying idle for more than two years while involved in litigation, the plant of the Oregon-Idaho Lime Products Co., has been purchased by Leo Hahn, former general manager, and will resume operations shortly. The plant, located near Agatha, Ore., will be re-equipped. The old steam engines will be replaced by moden Diesel power units.

Hold World Road Meet at Capital in October

55 NATIONS WILL SEND ENVOYS

At the invitation of the United States Government with the object of continuing the studies begun in Paris in 1908 and continued in Brussels, London, Seville and Milan, the Sixth International Road Congress will be held in Washington during the week of October 6th.

Accepting the official invitation from the American Organizing Commission of which Roy D. Chapin is president and Thomas H. MacDonald, chief of the Bureau of Public Roads is secretary general, the American Road Builders' Association will hold an exposition and road show in connection with the International Road Congress.

Delegates from fifty-five countries will be in attendance at this congress and exposition as well as a large number of highway officials and engineers from the states and counties in the East. Representatives from cities, counties and states throughout the entire country will be present.

The Road Builders' Association is holding an official exhibit at the invitation of the Organizing Commission and this will be held in Washington at the time when all the delegates are present.

Supply Sand and Gravel for N. Y. Penitentiary

The Clarence Sand & Gravel Co., with headquarters in Buffalo, N. Y., has erected a plant at Alexander, N. Y. It began operation May 1, 1930. This plant will supply sand and gravel for the construction of New York's new $12,000,000 prison at Attica.

BUILDING AND ALTERATION PERMITS FOR MARCH, 1930, COMPARED WITH MARCH, 1929, AND FEBRUARY, 1930, BY STATES

State	Mar., 1929	Mar., 1930	Feb., 1930	State	Mar., 1929	Mar., 1930	Feb., 1930
Alabama	$ 1,224,538	$ 556,201	$ 656,045	Nebraska	$ 590,898	$ 2,035,160	$ 152,550
Arizona	780,771	421,665	269,316	Nevada	174,050	81,425	122,500
Arkansas	299,390	349,988	350,901	New Hampshire	109,212	52,539	172,195
California	29,865,401	20,027,163	13,318,450	New Jersey	12,379,836	6,217,063	5,383,729
Colorado	2,558,033	919,050	662,113	New Mexico	230,837	267,175	138,553
Connecticut	5,559,570	4,147,406	2,697,900	New York	185,845,540	44,511,141	30,380,782
Delaware	637,056	1,885,558	394,795	North Carolina	2,253,034	1,194,278	1,050,866
Dist. of Columbia	5,204,035	3,083,040	857,170	North Dakota	851,096	112,299	17,700
Florida	2,945,022	1,328,762	1,015,284	Ohio	15,984,115	14,826,018	8,778,609
Georgia	2,006,741	2,523,695	767,323	Oklahoma	3,945,982	2,897,567	2,648,961
Idaho	223,370	172,557	294,524	Oregon	2,026,477	2,043,937	926,286
Illinois	28,520,866	8,402,724	8,371,883	Pennsylvania	17,921,207	10,593,306	5,618,071
Indiana	6,078,437	2,163,188	1,880,850	Rhode Island	3,119,485	1,746,388	944,565
Iowa	1,309,026	1,373,313	590,410	South Carolina	498,066	694,253	1,093,740
Kansas	1,765,157	1,722,012	2,091,420	South Dakota	138,190	224,526	54,875
Kentucky	1,539,520	772,555	537,605	Tennessee	2,719,509	3,011,853	2,103,370
Louisiana	2,469,735	1,155,889	506,027	Texas	8,842,450	7,759,610	5,502,017
Maine	126,180	226,270	103,013	Utah	806,928	534,720	158,785
Maryland	2,570,606	2,621,390	2,834,694	Vermont	none	3,000	34,000
Massachusetts	14,750,049	8,047,972	4,077,332	Virginia	2,459,916	1,314,892	798,603
Michigan	17,191,693	7,864,055	5,206,030	Washington	6,569,455	3,561,060	4,778,705
Minnesota	2,116,481	1,865,257	860,761	West Virginia	386,916	4,702,439	190,521
Mississippi	554,736	311,278	349,702	Wisconsin	6,061,985	3,932,839	5,568,699
Missouri	4,394,175	2,669,451	2,371,092	Wyoming	50,135	48,859	54,215
Montana	275,085	294,105	305,680	Totals	$408,931,092	$187,270,891	$128,043,217

Census Enumerators Take Building Data

COLLECT COMPLETE STATISTICS

For the first time in the history of the country, construction statistics have been collected by the Bureau of the Census while taking the 1930 census of the nation.

The statistics on construction will include the data obtained by the enumerators working on the special census of distribution. Figures on all construction work in process and contracted for will be sorted and compiled for the use of Federal agencies and other interested persons and organizations.

During the past few months the national staff and several members of the Associated General Contractors of America have co-operated with representatives of the Bureau of the Census in working out details, so that the compiled statistics will include the most useful data. A suitable form of return was prepared, and the names of some 14,000 contracting organizations furnished to the Census Bureau.

It is believed that information developed by the census will enable the Association to speak with certainty in its dealings with the Government and with other industries. Data which will be useful in determining the state of the industry and in stimulating a flow of money into the construction field have been collected.

Contracts Awarded for Michigan Lime Plant

The Inland Lime & Stone Co., Chicago, Ill., has awarded the contract for its new lime plant, to be constructed at Manistique, Mich., to Foley Brothers, Inc., of St. Paul, Minn. The contractors have started work on the construction of the storage bins and all concrete structures at the plant site.

Two Australian Cement Firms Complete Merger

The amalgamation of two leading portland cement producers in Australia,—the Australian Cement, Ltd., of Geelong, Victoria, and the Kandos Cement Co., Ltd., of New South Wales,—was recently completed.

Each of these companies will take over its debtors and creditors, according to the announcement, and the Geelong company will receive from the Kandos company a considerable cash consideration, which has not yet been disclosed. Both the Kandos and Geelong works have a capacity of 200,000 tons of cement annually, but the output at present is about 150,000 tons each annually. In the last two or three years the Geelong company has strengthened its position by installing another unit at its works, and a new limestone quarry has been opened up. The aerial ropeway has been replaced by rail transportation from the quarry to the plant.

Production of cement in Australia has been in excess of demands, and this brought about intense competition among some of the producers. The amalgamation of the Geelong and the Kandos companies will do away with any overlapping in interstate trade by the two companies.

First Kaolin Shipment Made from Idaho Mines

The Aberdeen Clay & Color Co., of Aberdeen, Wash., has made its first shipment of kaolin from a new deposit located at Moscow, Idaho. The company may build a plant at Moscow in the near future, according to press reports.

Wisconsin Quarry Being Made Ready to Operate

The Morman quarry, located near Burlington, Wis., is soon to be reopened after several years idleness and production of crushed stone will follow. Water is now being pumped from the quarry and new plant equipment will be installed shortly.

Talc Company in North Carolina in Operation

The Craig L. Rudisill Talc Co., of Marshall, N. C., recently organized by Craig L. Rudisill, E. F. Wallin and A. B. Silver, has gone into production, talc, soapstone and chalk crayon being manufactured. The company also plans to market considerable talc dust in the near future.

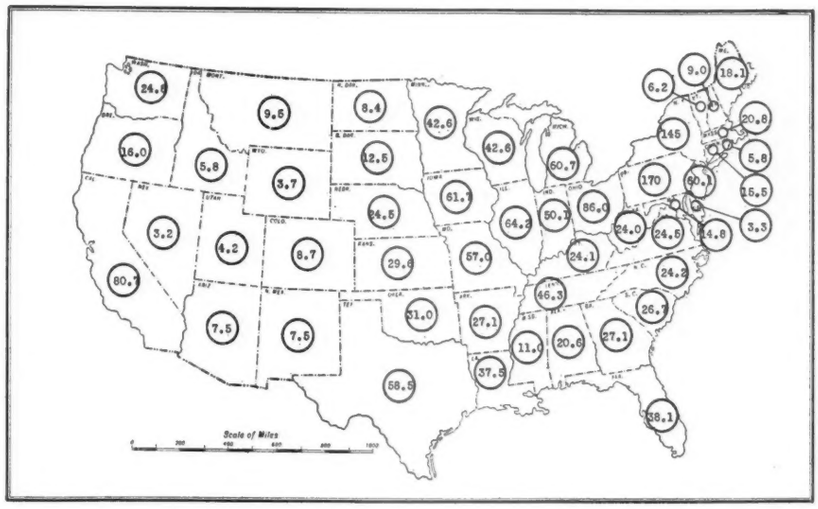
State Road-Building Programs Tabulated

MISSOURI IMPROVES 2,300 MILES

The American Road Builders' Association has begun the compilation of highway program data for each state. The information has been completed for Missouri, and includes the names and titles of all members of the state highway officials, names and addresses of all division engineers, area and population of the state, existing state and highway mileage, motor vehicle registration, estimated wealth, state and county expenditures for highways, existing mileage by types of road, proposed construction for 1930 by types, and numerous other items of interest to producers of materials.

Similar data will be compiled for other states as rapidly as possible. Missouri's program for this season includes 500 miles of concrete paving, 473 miles of gravel surfacing, 754 miles of grading on the state system, and 600 miles of state supplementary roads. This construction will be financed by proceeds from road bond sales plus basic revenues. Highway beautification, now receiving much attention in eastern states, will be continued in Missouri.

The accompanying sketch-map shows the proposed expenditures by states this year, expressed as millions of dollars. These estimated figures were made prior to any Congressional exactment increasing Federal Aid allotments and are exclusive of state road bond payments on interest and principal. On account of the recent Federal Aid enactment, it is estimated that approximately $120,000,000 additional to the above figures will be spent throughout the country for paving and surfacing other roads.



State and local highway and bridge expenditures, estimated for 1930, expressed in millions of dollars, as reported by state authorities.

Plant Near St. Louis in Operation June 1

1,000-CU.-YD. OUTPUT PLANNED

Modern Coal & Material Co., St. Louis, Mo., is building a new sand and gravel plant with a capacity of 1,000 cu. yd. per day at Pacific, Mo., about 45 miles southwest of St. Louis, on the Meramec River. The new plant will be in operation about June 1.

A Sauerman 1½-cu. yd. slackline cableway excavator is used in the pit. The plant is of all-concrete construction with the exception of the timber superstructure over the concrete bins. Stephens-Adamson revolving screens, a Simplicity vibrating screen, and a Good Roads sand classifier are used. No crushing is necessary. A General Excavator ¾-cu. yd. gasoline crawler shovel is used for rehandling material.

With the exception of the gasoline crane all operations are electric, General Electric motors and equipment being used. The plant is designed to be so flexible that any kind of material specified can be produced.

In about a year, when the pit is sufficiently enlarged, a 12-in. hydraulic dredging unit and a crusher will be installed. Belt conveyors will also be added at that time. These changes will increase the capacity to about 1,500 cu. yd. per day.

The company has a material yard at 154 Lafayette St., St. Louis, where the office is located, and formerly operated a small sand and gravel plant at Festus, Mo. Officers are: J. M. Steffen, president; E. M. Steffen, vice-president and plant superintendent; A. J. Ketzner, treasurer; and Wm. Roemheld, secretary.

County in Oregon Will Install Crushing Plant

The Washington County, Oregon, commissioners are preparing to install a crushing plant shortly to supply aggregates for the construction of a 150-pile concrete trestle over Rock Creek, near Hillboro, Ore., and for road stone on several county projects.

Improved Facilities at New York State Plants

Eastern Rock Products, Inc. has greatly improved its production facilities. A number of changes have been made in the plant at Sterling Creek, near Utica, N. Y., including the addition of a complete stone-crushing plant, a pipe line to carry water from the barge canal in excessively dry weather, and better washing equipment.

Plant No. 5 at Oriskany Falls, N. Y., was completely rebuilt last winter. This stone plant uses no bucket elevators but relies on belt conveyors, and uses vibrating rather than rotary screens.

A new sand-and-gravel plant is being opened at Shenango Bridge, near Binghamton, N. Y.

International Salt Co. Closes Sterling Deal

On April 17, 1930 it was announced that Sterling Salt Co. had been acquired through Retsof Mining Co., a wholly-owned subsidiary of International Salt Co. The price paid was announced to be $2,000,000, which, it was anticipated, together with the other assets, would mean a distribution to Sterling stockholders of about $29 a share. It was said that an initial payment of $25 a share to stockholders would be made about June 1, 1930.

Patent Infringement Is Charge Against Sand Co.

An injunction restraining the Pioneer Sand Co. from using a device for sand grading is asked by Frank M. and Chester C. Anderson, in a patent infringement suit filed in the Federal Court at St. Joseph, Mo. The Andersons allege the sand company has copied a device upon which they have a patent, and that it has been using the device since August, 1926.

Huge Dragline Moved at Rate of Mile per Week

One mile a week for three weeks of constant movement! This was the top speed recorded in the recent removal of a 250-ton, 5-cu. yd. dragline machine from the Reliance to the Durbin plant of Consolidated Rock Products Co. of Los Angeles, Calif.

The Reliance plant is near Azusa, on the Southern Pacific tracks. The rock company first secured permission to move the weighty machine over highways to its new site but, owing to its width, height and bulk, more than 700 electric and telephone connections would have had to be cut before it reached the Durbin plant.

Company officials decided to move it the three miles to the Durbin unit over its own road; a road which consisted of two parallel, standard-gauge tracks laid in the bed of the San Gabriel river, on which both plants are located. Over these, an inch at a time, the engine hauled itself along three miles under its own power, taking three weeks to complete the journey.

In position at Durbin, the machine will replace two 2½-cu. yd. draglines and will excavate rock, sand and gravel at the rate of more than 100,000 tons a month.

Praise Greets 1930 Edition of Handbook

DIRECTORY SECTION ACCLAIMED

Few works have been greeted with the acclaim that has already been given the 1930 edition of PIT AND QUARRY HANDBOOK AND DIRECTORY. From every state and from every type of non-metallic mineral producer have come letters of praise and congratulation. Engineers, superintendents, presidents, chemists, equipment makers, and geologists are among the men of special and varied interests from whom commendatory letters have been received.

The sections devoted to technical and non-technical discussions have been praised very highly, and the Directory has made a strong appeal to those who find it of greater interest than the portions dealing with operating problems. Everyone commends the change in form—the larger pages, the larger type, and the clearer illustrations—and the unusually good printing and binding. The indexes are filling the need for which they were designed, as is evidenced by the many congratulatory comments on this new feature. Directory users are agreed that, in completeness, convenience and clarity, the new work overshadows everything of its kind heretofore published.

Organize Sand Company at Klamath Falls, Ore.

Announcement has been made of the organization, at Klamath Falls, Ore., of the General Sand & Gravel Co. The new firm has leased the sand and gravel business of the Porter Construction Co., and will distribute materials from the construction company's bunkers and warehouse.

The new company is producing the Williamson river sand from a deposit containing 1,250,000 cu. yd. of material.

The sand is being shipped to Klamath Falls by rail and by water.

New Lime Company to Build 400-Ton Plant

R. L. Hollingsworth, vice-president and general manager, reports that the California Lime Products Co. of Sacramento, Cal., is planning the erection of a plant that will eventually treat 400 tons of lime rock daily, using rotary kilns and producing building and agricultural lime, and recovering the kiln gases for the manufacture of approximately 50 tons of solidified carbon dioxide per day.

Idaho Portland Has Improvement Program

SPENDS $60,000 AT INKOM PLANT

Improvements to the plant of the Idaho Portland Cement Co., at Inkom, Idaho, totalling $60,000, will be made this summer, it is reported. Among the improvements will be an electric crane, new bins and crushing equipment. The company has been considering the construction of a cement products plant at Inkom, but no action was taken at a recent directors' meeting, the project having been deferred to a later date.

Wire Saw 1,400 Feet in Length Used in Ozarks

A quarter-inch, three-stranded steel wire, 1,400 ft. long, driven by an old four-cylinder automobile engine, is sawing huge slabs of marble from a hillside in the Ozark region of Arkansas.

Wire sawing already has proved its value in slate quarrying in Pennsylvania, and this is one of the first applications of the method to other fields, W. M. Weigel, mineral technologist of the Missouri-Pacific railroad, told the American Institute of Mining and Metallurgical Engineers at a recent meeting in New York.

Sand, hand-fed into the artificial crevice the wire makes, does the actual cutting. The wire travels 20 ft. per second and cuts a complete section from the hill without wearing out and breaking. The entire operation is carried on by one man.

Cement Plant Employee Leaps from Silo; Dies

Amelio Conti, 32, cement worker at LaSalle, Ill., leaped 119 ft. from the top of a cement storage silo to the ground recently. A verdict of suicide while mentally deranged was returned by a coroner's jury.

Lower Output Reported in Luxemburg Quarries

Although the quarrying industry in general in the Grand Duchy of Luxemburg continued to develop in a satisfactory manner in 1928, due to a flourishing condition of the building industry and public-road construction, some specific quarrying industries suffered a decrease. The lime industry suffered from foreign competition; production was 25,126 tons (metric) of quicklime as against 28,562 tons in 1927; exports of quicklime were 9,630 tons in 1927, and 5,968 tons in 1928. Gypsum showed a decrease in raw rock, largely on account of substitution of other sources for the cement mills of Belgium, but calcined plaster increased. In 1927 the raw gypsum rock produced was 7,848 tons, of which 5,869 tons was exported; in 1928 the production was 2,506 tons and exports 473 tons. Plaster production in 1927 was 9,814 tons and, in 1928, 11,888 tons. Only a small quantity of plaster was exported—302 tons in 1927 and 350 tons in 1928. During 1928 there were five gypsum plants in operation, three of them obtaining their rock by mining, and nine gypsum kilns were operated.

Overcome by Gas Blast in N. Y. Cement Quarry

Gas generated by a blast of dynamite at a cement plant penetrated a cave at Howe's Cave, N. Y., recently, overcoming two workmen to such a degree that their recovery is doubtful. Three volunteers who attempted to rescue them from a point 200 ft. below the earth's surface staggered back to fresh air and were rushed to a hospital in Albany.

John Sagendorf and Owen Wallace, the original victims, were rescued by firemen wearing gas masks, who had come by airplane from Schenectady.

Physicians with respiratory apparatus set to work in an effort to resusticate the two men, although they had been subjected to poisonous fumes for four hours.

Deliver 200 Carloads of Stone to Chicago Museum

More than 200 carloads of limestone have been supplied to date by the Shawnee Stone Co., of Bloomington, Ind., for the reconstruction of the old Fine Arts Building in Jackson Park, Chicago, which is to house a new industrial museum. Approximately 600 carloads are still to be shipped. A force of nearly 100 men is employed by the Shawnee company on this particular job.

Improved Make-Up Met With Favor by Readers

Hundreds of letters received by PIT AND QUARRY during recent weeks indicate with unmistakable clearness the widespread approval with which the change in the make-up of the paper has been received. Readers have been quick to see the advantages to them of a news section in the front of the book, and they appreciate, too, the fact that an active and growing industry is being given the news treatment which its importance and many rapid changes merit. The new headings and the improved departments have come in for their share of praise, and the more convenient arrangement of the contents has been favorably commented upon by nearly all who have written.

F. E. Tyler First to Enroll in Campaign

NO-ACCIDENT DRIVE IN JUNE

F. E. Tyler, president of the Dewey Portland Cement Co., Kansas City, Mo., was the first cement company executive in the nation to sign up in this year's June No-Accident drive, according to advices from the Portland Cement Association. Mr. Tyler, as head of his organization, took a pledge to participate personally in the campaign and committed his company to the effort.

The Dewey company in past years has been active in producing a formidable safety record, and it is the belief of company executives that the work will be carried to an even greater state of perfection during the 1930 campaign.

F. E. TYLER

According to the Association, its entire membership has been or will be enrolled shortly. The campaign this year is being featured by the formation of a so-called No-Accident Legion, in which each man signs a pledge to operate safely during the month.

LeRoy, N. Y., Stone Plants Begin Spring Production

The crushed stone plants of the General Crushed Stone Co., and the LeRoy Lime and Crushed Stone Corp., at LeRoy, N. Y., have resumed operations for the season. The former is employing about 100 men while 50 or 60 are on the payroll of the latter company.

Lehigh Valley Cement Plant Operates on America's Pioneer Mill Site

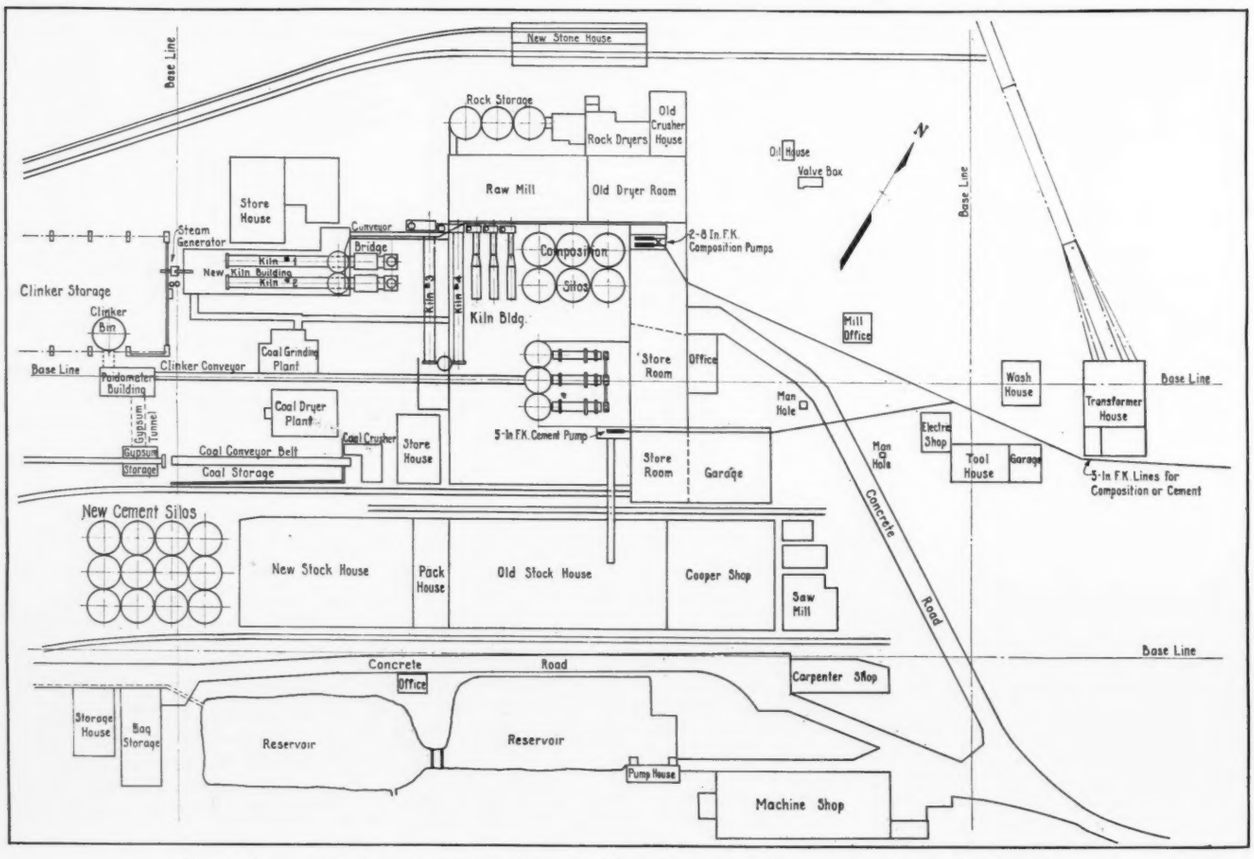
David O. Saylor's Company Began Producing as Echoes of Civil-War Cannon Died Away

THE Coplay Cement Manufacturing Co. and the manufacture of Portland cement in the United States began at almost the same time and developed together. David O. Saylor, after whom the cement manufactured by the company is named, was the first to manufacture Portland cement successfully in this country. He was granted a patent on his process in 1871, and the company was incorporated with David O. Saylor as president in 1866. He then selected the rock deposit owned by the present firm.

Previous to this time European cements had been preferred to the American but in 1876, at the Centennial Exposition in Philadelphia, Saylor's Portland cement was exhibited with various well-known European brands and received the award for its superior quality. American-made Portland cement then gradually became accepted by engineers and the United States Government, and, in 1878, the famous Eads jetties at the mouth of the Mississippi River were built using Saylor's cement. To-day, after 50 years of exposure to the elements, these jetties are in excellent condition. Since the formation of the company over 40,000,000 bbl. of Saylor's Portland cement have been used in this country in every kind of construction work.

The operations of the company at Coplay, Pa., are in themselves a cross-section of the Portland cement industry in this country. At this plant can be found the old-fashioned dome-type lime kiln, the high, upright Schaffer kiln now used mainly in lime manufacture, and the modern improved rotary kiln. Other developments through which the company passed were to change from the fine grinding of rock and clinker by old-fashioned burr-stones to the steel mills now used and the change from steam to electrical operation. Incidentally, this was the first electrically-operated cement plant. An indication of the growth of this company is given by the annual production capacities which were 5,000 bbl. in 1866, 480,000 bbl. in 1906, 2,000,000 bbl. in 1916, and 2,400,000 bbl. since 1926.

In spite of the fact that this plant is one of the oldest now in operation it has several features



General ground plan of Coplay Cement Manufacturing Company's plant, Coplay, Pa.

The ivy-covered office building with Mill B in background.

which are found in only a few of the newest and most modern plants. The most important of these is the flexible, independent control of each department and the storage facilities between them which obviates loss of production due to the necessity of shutting down any part of the plant operations in case of a breakdown. Another feature is the thorough mixing of materials throughout all operations from quarry to storage which insures a uniformly high grade of cement.

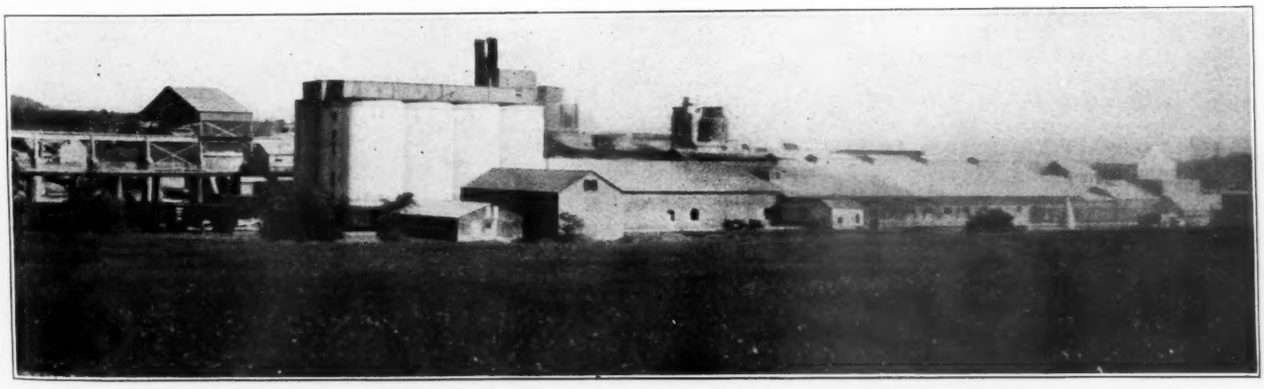
The operations are divided into three separate units. Mill A is the original mill erected on the property many years ago. The old vertical kilns are all of this plant that remains standing. Mill B is the second mill of the company. It replaced Mill A and was in turn replaced by the present Mill C. Parts of Mill B, including the four rotary kilns, coal mill, clinker grinding equipment, stockhouses and packhouses, are being used intermittently when demand requires. No raw material is processed there.

The limestone deposit owned by the company consists of 360 acres near Coplay, Pa., which is about 6 miles north of Allentown. This deposit contains argillaceous limestone and a high-grade limestone consisting almost entirely of carbonate of lime. There is an almost inexhaustible supply of both kinds of rock, their uniformity insuring an unvarying quality and color in the cement produced. The value of the rock in this section is evidenced by the number of large and well-known cement plants which have been erected in this vicinity, forming the famous Lehigh Valley District which, although it comprises only a small part of eastern Pennsylvania, manufactures over 25 per cent of the cement made in the United States.

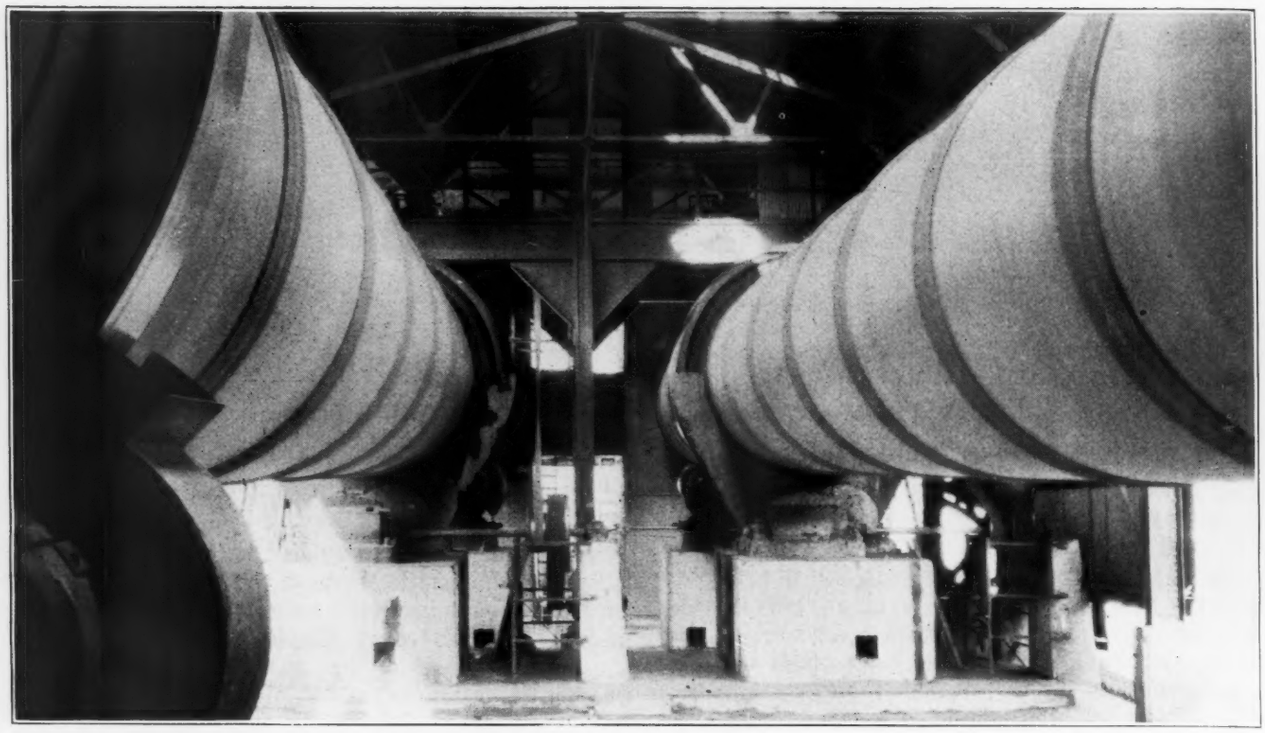
The quarry which supplies the cement rock is about one-half mile west of the plant and is one of the deepest in that section. This quarry has been worked for over 25 years and from all indications is good for almost as many more. The face in the main part of the quarry averages about 180 ft. in height although in some places it is over 200 ft. The quarry floor is about 7 acres in extent. Lower levels are being started in two places and these are each about 65 ft. below the quarry floor.

The stone is in the Jacksonburg formation on the borderline between the Cambrian and Ordovician periods and is very suitable for cement making, having a calcium carbonate content of between 69 and 75 per cent. Some limestone with as much as 92 per cent calcium carbonate is also obtained in the quarry and is added in sufficient quantities to keep the calcium-carbonate content about 76 per cent. This is the first step in the thorough mixing which is carried on throughout the operations.

The overburden averages about 12 ft. in depth, but is gradually getting deeper as the quarry is enlarged. A Marion electric dragline with a ¾-cu. yd. Page bucket removes the dirt and discharges into a 4-ft. by 8-ft. steel hopper feeding a 20-in. belt conveyor. This is a portable conveyor 800 ft. long in two sections and can be moved whenever



View of the plant from the south showing the new silos and open storage at left.



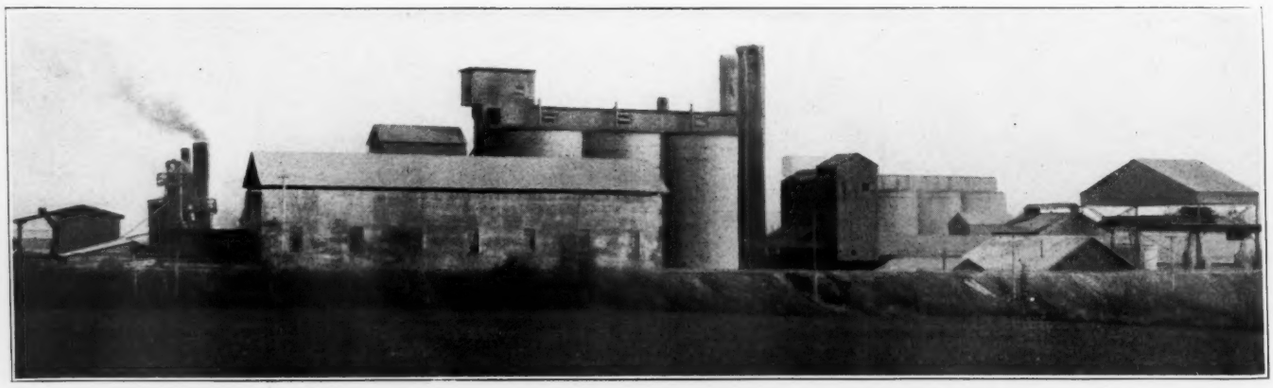
Looking toward the feed end of two of the rotary kilns.

desired. Each section is driven by a 10-hp. General Electric motor through a DeLaval speed reducer. The discharge half of the conveyor has a movable tripper allowing discharge wherever desired. Occasionally it is necessary to remove some overburden in a place which would require too much moving of the conveyor. In this case the dirt is loaded into Easton 3-cu. yd. steel side-dump cars on 30-in. track, and hauled to a dump by Baldwin 8-ton steam locomotives.

Drilling is done by two Loomis Clippers, and a Sanderson Cyclone gasoline well drill using 6½-in. chisel-type bits. The holes are drilled the full height of the face and to about 8 ft. below the quarry floor. Single-row bank shots with 14 or 15 holes, about 34 ft. back from the face, have been found to give the best results and these are made about three times a year. As many as 41 holes have been shot at one time, bringing down over 320,000 tons of rock. Trojan dynamite and Cordeau-Bickford safety fuse are used. The small shots are fired from one end only, while the large ones are fired from both ends. Secondary drilling is done with Ingersoll-Rand and Gardner-Denver jackhammers and Trojan dynamite is used for secondary blasting.

The stone is loaded by a Marion 2½-cu. yd. electric shovel, a Marion 2½-cu. yd. steam shovel and an Osgood ¾-cu. yd. steam shovel. These load into 5-cu. yd. end-dump steel cars which are hauled in trains of four to the incline from the quarry by four Vulcan 8-ton gasoline locomotives. The tracks are so arranged about the quarry that the traffic is all one way, preventing any delay of the loading operations.

The cars are hauled, one at a time, up the incline, which is 400 ft. long and has a slope of 22 deg. The balanced system is used, the returning empty car helping to pull up the loaded car. A Flory 2-drum hoist, direct-driven by a 125-hp.



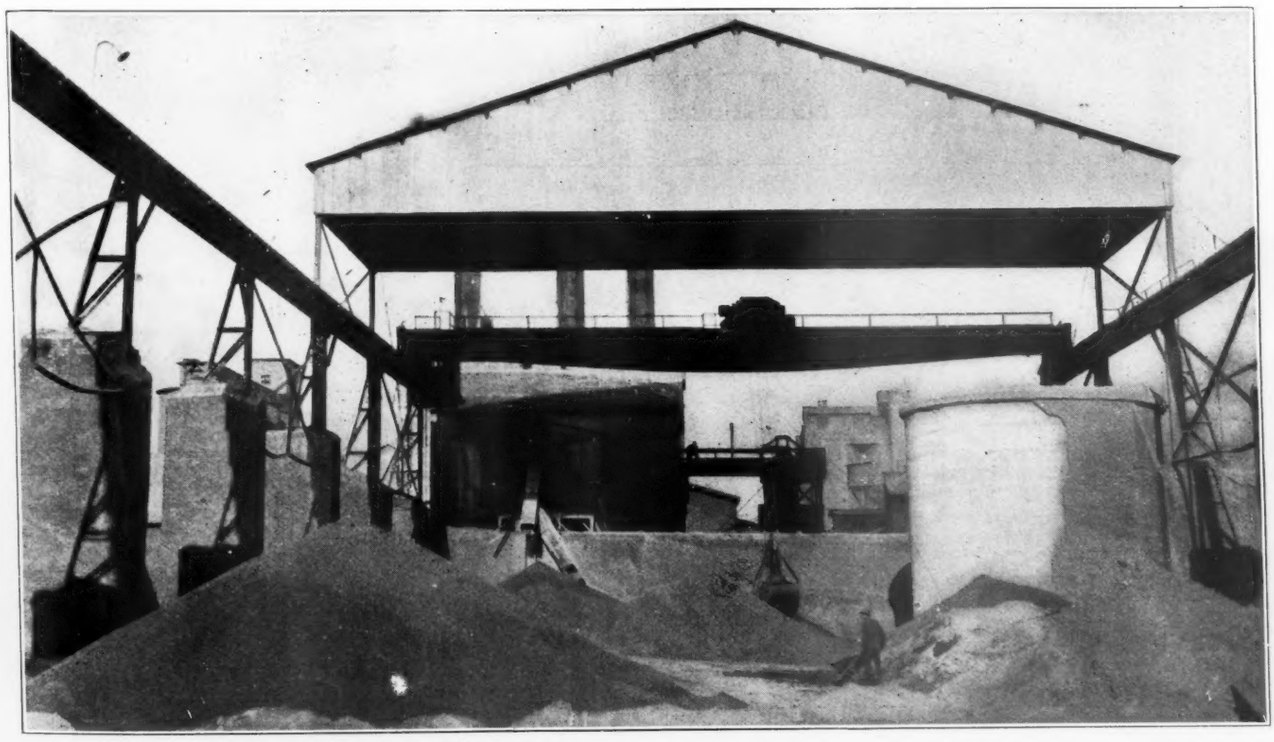
The plant from the Northwest. Stone house at left, open storage at right.

Track from quarry at left. Coal track at right.

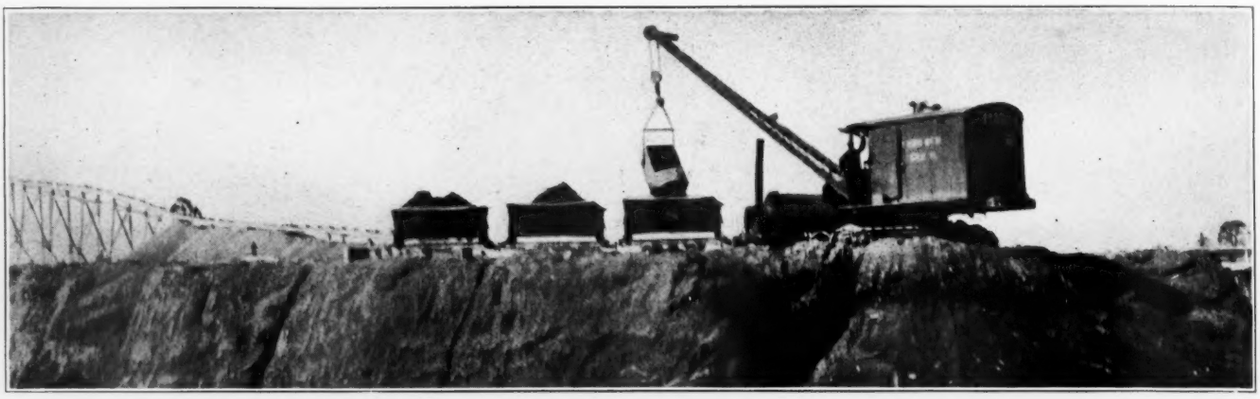
General Electric motor, operates the system. The cars on reaching the top of the incline are automatically dumped into the Allis-Chalmers McCully No. 10 gyratory primary crusher which reduces the stone to 3 in. and under. This crusher is belt-driven by a 100-hp. General Electric motor. A Curtis air hoist over the crusher operates a stone hook for dislodging any unusually large stones.

The primary crusher discharges into a chain-bucket elevator feeding through a split chute into two steel storage tanks with a total capacity of 250 tons. These discharge through undercut gates into 5-ton Easton steel rocker-dump cars which are hauled to the plant in a train of twelve cars by a 16-ton Vulcan gasoline locomotive. Another locomotive of the same make and size is kept in reserve. The stone is loaded and discharged from these bins in such a manner as to give the material a preliminary raw mix.

Water is drained out of the quarry from a sump which is 75 ft. long and 50 ft. wide. This is large enough to hold several days' seepage in case of a shut-down of the pumps. A floating pump house contains an Aldrich 5-in. by 6-in. centrifugal pump which is direct-driven by a 125-hp. electric motor. This pumps about 1,200 g.p.m. against a 250-ft. head. A flexible length of Standard fire-hose connecting the pump with the stationary pipe-line allows for any variations in the water level. An Allis-Chalmers 6-in. by 6-in. centrifugal pump is kept for emergencies. This pumps to a booster of the same make and size near the top of the quarry.



Open clinker storage, showing overhead crane and clinker bin at right.



Stripping overburden into cars with a ¾-cu.-yd. dragline. Conveyors in background.

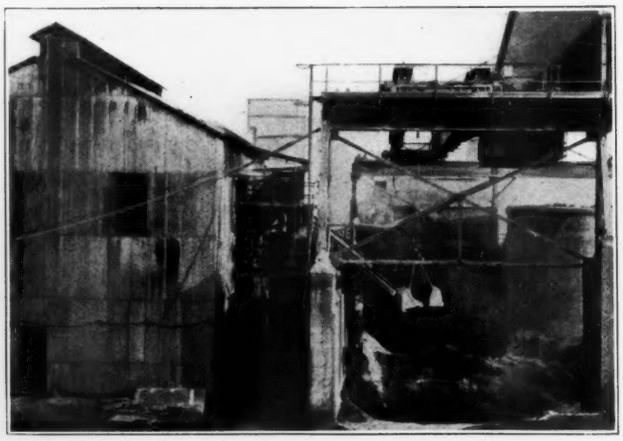
Each of these pumps is driven by a direct-connected 75-hp. motor.

Some of this quarry water is diverted to a filter house where it is pumped by an Aldrich 100-g.p.m. capacity centrifugal pump through an American Water Softener Co. purifier and through underground pipes to three steel storage tanks supported on structural-steel framework. The water is piped from these tanks to the plant, the pipe-line running through the discharge flume from the quarry keeping the water cool at all times of the year.

About a year ago the framework supporting the tanks was walled in making a washroom for the quarry employees. This contains lockers, washbowls and two showers with hot and cold water, and has steam heat. There is a steam-heated locomotive house in the quarry and one on top, and a small building which contains the quarry superintendent's office and a parts storage room. All of these buildings are heated from a central plant through underground pipes. An Ingersoll-Rand Imperial Type 10 air compressor, with 10-in. and 16-in. cylinders and 14-in. stroke, furnishes air for the jackhammers and the air hoist. All quarry repair work is done in shops at the plant.

The cars are run into the stone house at the plant and dumped by hand into a rectangular con-

Car descending incline, and 2½-cu. yd. steam shovel in quarry.



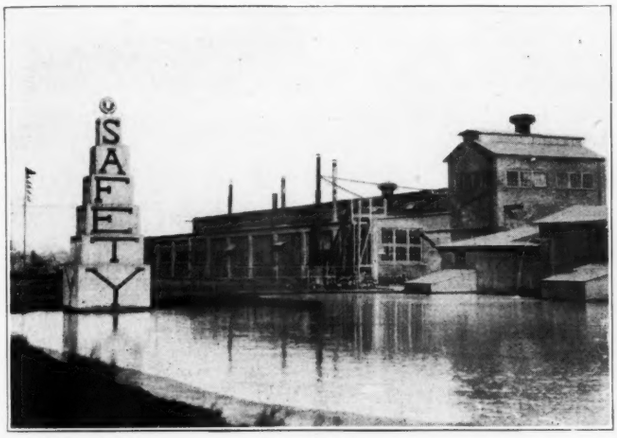
A close-up view of the clinker storage showing crane which handles the material.

crete bin 125 ft. long and 20 ft. wide with a capacity of about 2,000 tons, all of which can be recovered without rehandling. A similar bin of the same size on the opposite side of the building is used for limestone which is shipped from another part of the state. This limestone has a calcium-carbonate content of about 98 per cent. These bins and the bins at the quarry have sufficient storage capacity for two weeks' operation of the plant.

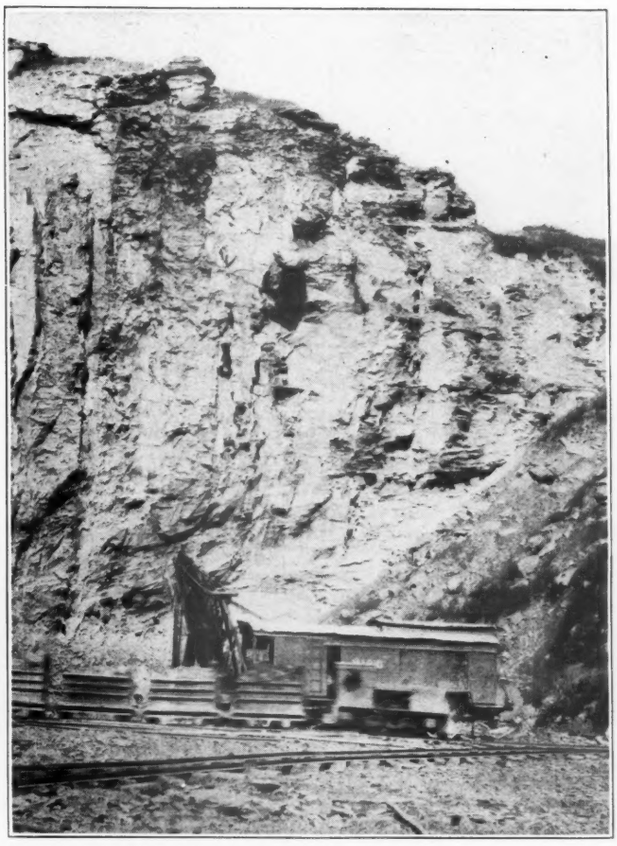
Each of these bins feeds through twelve undercut gates onto Robins belt conveyors in concrete tunnels under each bin. The gates are operated by a reciprocating mechanism which feeds from all of them at the same time continuing the mixing process begun in the quarry and in the primary crusher bins. The cement stone conveyor is 30 in.

wide and 125 ft. long and discharges to a short inclined conveyor to the crusher building. Both are chain-driven through the same DeLaval speed reducer.

The limestone conveyor is 24 in. wide and 125 ft. long and is also chain-driven through a DeLaval speed reducer. It is inclined at the discharge end and feeds to a bucket elevator which discharges through a steel chute to an Allis-Chalmers Superior 54-in. by 24-in. roll crusher. This discharges by a bucket elevator and conveyor to the dryer feed bin. The cement stone goes in the same manner to a similar roll crusher and bin. A large 5-kw. Cutler-Hammer magnet suspended over each of these conveyors removes any iron present in the rock before it goes to the crushers.



Plant safety reminder at left with machine shop and fire-pump building in background.

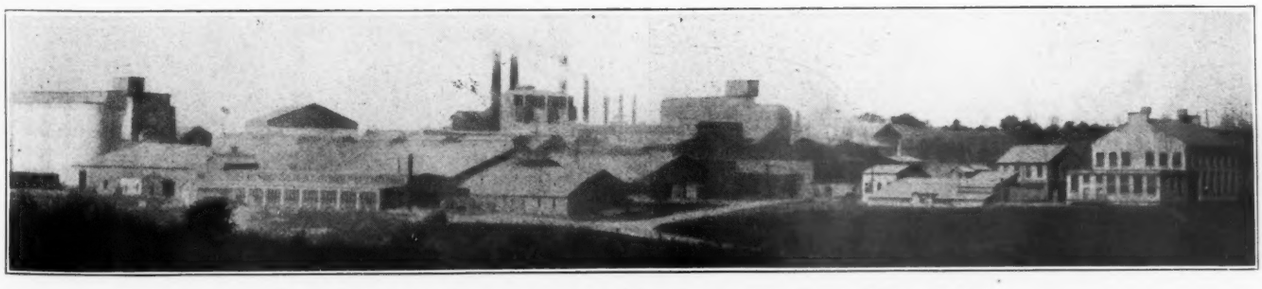


Shovel loading stone at quarry.

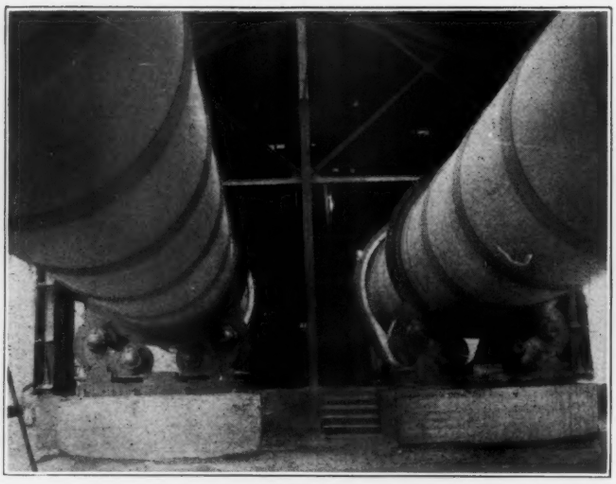
The four Power & Mining Machinery Co. rotary dryers are pulverized-coal fired. They feed by drag chain conveyors to a two-compartment steel bin. The two kinds of stone are fed from this bin by two Schaffer Poidometers which automatically proportion them by weight. A 12-in. drag-chain conveyor then takes the proportioned stone to the hammermill building, where a steel-enclosed bucket elevator discharges into a circular steel bin. This discharges into an SXR8 Pennsylvania hammermill which is belt-driven by a 200-hp. motor. Another 12-in. drag-chain conveyor, steel-enclosed, feeds the pulverized stone to three concrete storage bins of 2,000 tons' capacity each. These are fed alternately, changing every hour, giving another mix to the stone. Both of the 12-in. drag chains were furnished by the Bethlehem Foundry & Machinery Co.

The bins discharge through six gates, of the same reciprocating type used under the raw bins, to a belt conveyor and, by a series of conveyors and elevators, to the raw-mill building. A drag-chain conveyor then distributes the material into a long concrete bin over the eighteen Fuller mills. This bin has a capacity sufficient to run the plant for 10 hours, further insuring the plant against shutdowns due to minor mishaps. One of the Fuller mills is a 57-in., two are 54-in. and fifteen are of the 42-in. size. They are belt-driven by individual upright electric motors of 150 hp. and 75 hp. respectively.

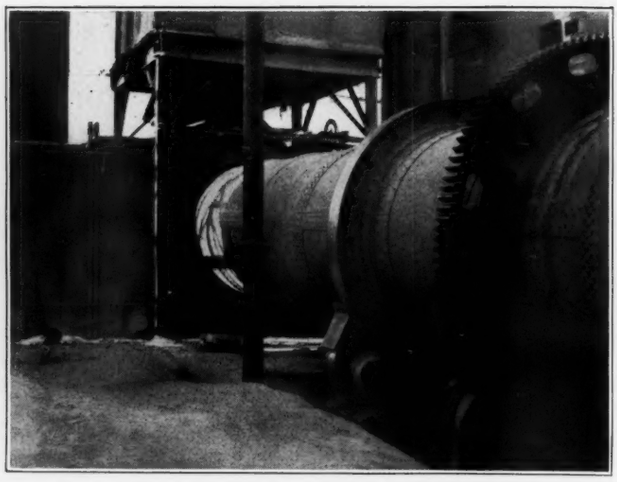
The Fuller mills discharge the finely ground stone, 88 per cent or more of which will pass through a 200-mesh screen, by a series of conveyors and elevators to the composition silo building. Here the stone goes to eight concrete com-



View of the plant from the east. Mill office and power-house at right.



Looking toward the firing ends of the kilns.



View of one of the old rotary kilns showing drive.

bined storage and blending tanks of 600-ton capacity each. The tanks discharge, by means of conveyors and elevators, to four steel kiln feed tanks, one for each kiln, which hold enough material for a 10-hour run. These feed by Bethlehem paddle feeders into the kilns. The arrangement is such that the composition tanks can be by-passed and the stone fed direct from the Fuller mills when special cement is to be made.

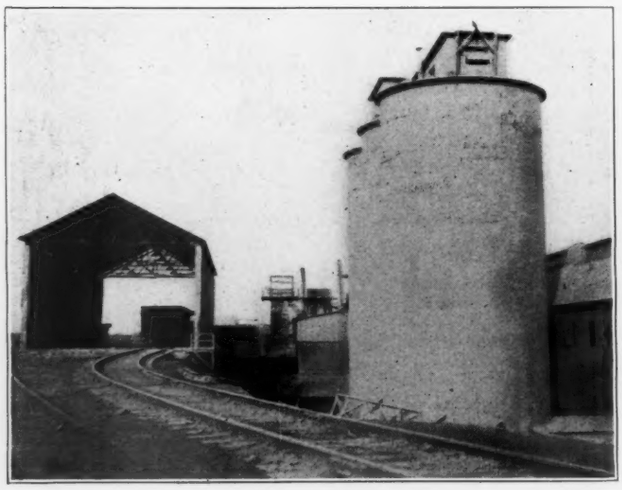
The composition tanks can also feed through a series of screw conveyors to two 8-in. Fuller-Kinyon pumps, one of which pumps the powdered stone a distance of 1,900 ft. through a 5-in. underground pipe-line to the kiln feed bins at Mill B. The filling of these bins is electrically controlled by the pump and compressor operator at Mill C. This line will handle from 50 to 70 tons per hour.

The surplus stone that this pump cannot handle goes to the second 8-in. Fuller-Kinyon pump which can discharge back either into the same elevator that feeds the fresh material from the raw mills into the composition silos or into the kiln feed tanks. These two pumps are so arranged that if one should break down the other could be used by merely throwing a valve.

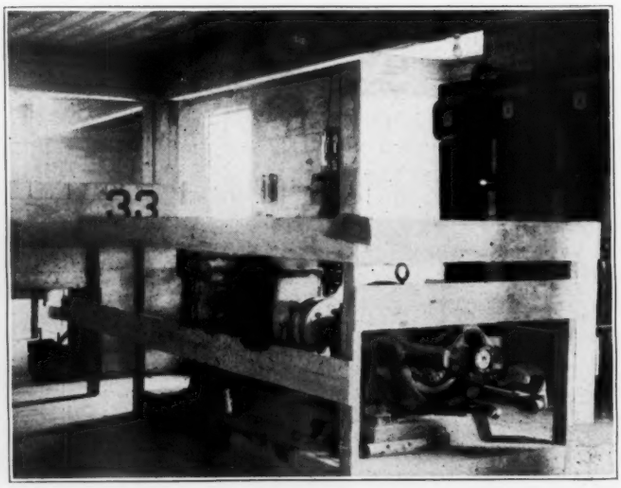
Three of the four kilns are 9 ft. in diameter by 125 ft. long, and one is 7½ ft. in diameter by 125 ft. long. The two newer 9-ft. kilns, furnished by the Vulcan Iron Works, were installed six years ago under the supervision of Major F. H. Lewis, nationally known authority on cement plants, who, at that time, was operating manager. These two kilns are belt-driven by 30-hp. motors.

Two of the kilns discharge into a trough and the clinker is carried to the 60,000-ton-capacity open clinker-storage adjoining the kiln building by a 16-in. Bethlehem special manganese-steel drag-chain conveyor. This conveyor, which operates on 375-ft. centers, takes hot clinker from the kilns to storage on its top strand and cooled clinker from storage to the mill building on its lower strand at the same time. It is driven by a 50-hp. motor and has a capacity of 750 bbl. per hour of cold clinker and 80 bbl. per hour of hot clinker. Take-up in the conveyor is accomplished by a vertical weighed idler on the upper strand. The other two kilns discharge into a special Bethlehem Foundry inclined elevator to a storage pit from which clinker is handled to the open clinker storage by the electric crane described below.

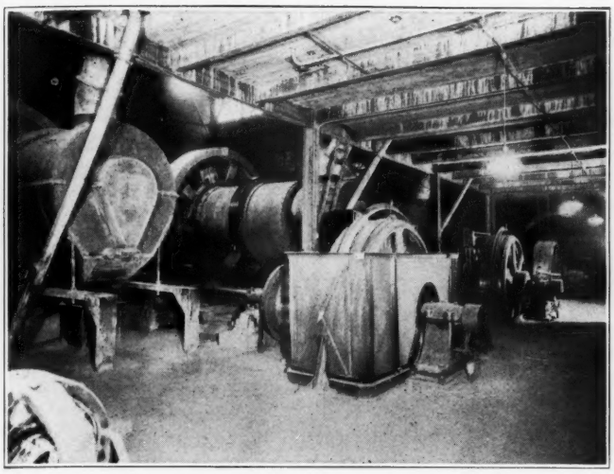
A Morgan 10-ton overhead electric crane operating on a 100-ft. span and serving a space 210 ft.



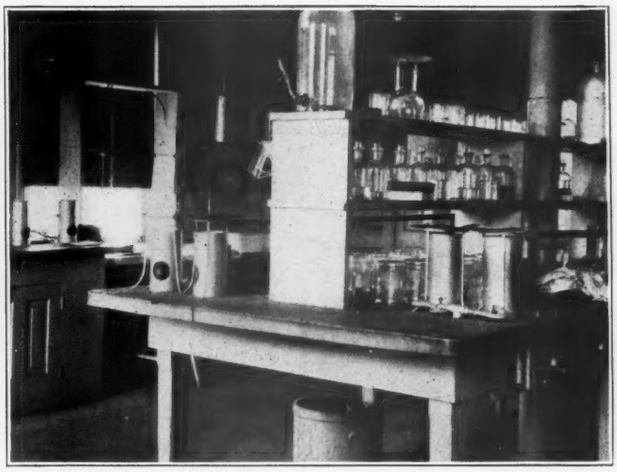
Stone house (left) and rock-storage silos (right).



Motor and reducer driving screw conveyor above silos.



Compartment mills with motor drives in foreground.



A view of the well-equipped chemical laboratory.

long distributes the hot clinker for cooling. The same crane rehandles the cooled clinker into a clinker bin from which it is fed by a short belt conveyor into an 18-in. by 24-in. roll crusher which is driven through a Jones speed reducer by a 20-hp. Westinghouse motor. Another Cutler-Hammer magnet similar to those in the stone house prevents any iron from getting into this crusher.

Gypsum is unloaded from cars into a 7-car-capacity concrete storage bin. This discharges by gravity to a belt conveyor feeding to a bin in the Poidometer building. Two Schaffer Poidometers working together proportion the clinker and gypsum and discharge to the 16-in. drag-chain conveyor previously described.

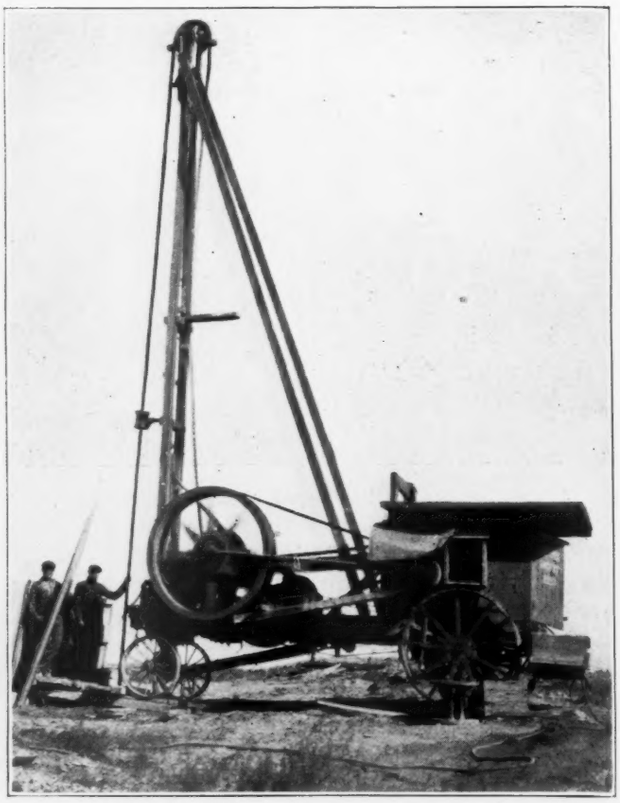
The drag-chain conveyor feeds to a specially-designed single-strand chain elevator on 91-ft. centers which discharges into three concrete storage silos of 2,000-bbl.-capacity each. This elevator is unusual not only in its height but in the novel type of construction. It is enclosed by a 6-in. concrete-wall casing with two interior vertical columns heavily reinforced. These have four 6-in. by 6-in. by ¾-in. angles embedded in their corners running from boot to head shaft for elevator guides. The buckets are 12-in. by 24-in. and are attached by eight rivets each. Pins 1¼ in. in diameter are used on the chain. This elevator handles 750 bbl. of clinker and gypsum per hour and has been operating for 3½ years without renewal of any kind.

Three Schaffer Poidometers feed the mixed clinker and gypsum from the storage silos to three 7-ft. by 42-ft. Polysius four-compartment mills for final grinding. These mills are of the latest type and have been in operation only since 1926. Each of the mills is driven through a pinion shaft by a 600-hp. super-synchronous motor. They discharge the cement to a series of conveyors which feed another specially-designed elevator of the same type as the one previously described. This elevator, which has been in operation less than a year, has a capacity of 600 bbl. per hour and discharges the cement into the new cement-storage silos. It is chain-driven by a 30-hp. Westinghouse motor through a Falk herringbone-gear reducer.

The cement can also be fed from the mills by a series of conveyors and elevators to a conveyor system which stores the cement in two stockhouses (one old and one new). These are of 57,000-bbl. and 43,000-bbl. capacity respectively. Conveyor sys-

View showing driving arrangement on the compartment mills.

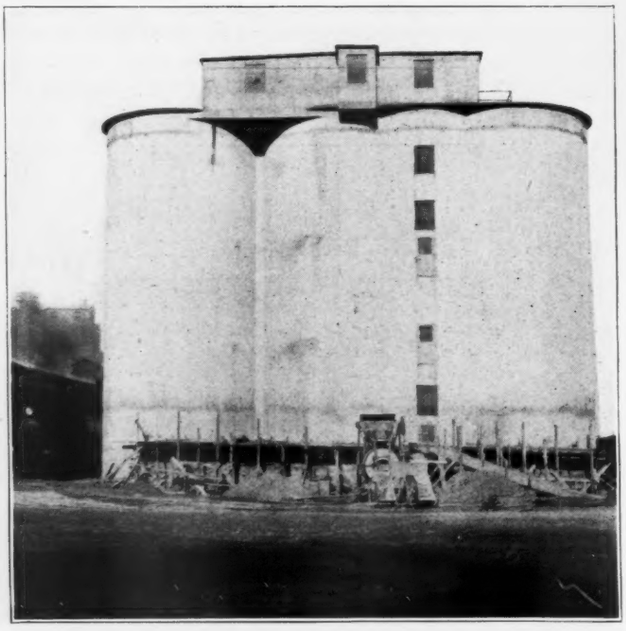
H. B. Wrigley, chief engineer, and G. G. Brewer, purchasing agent, beside gasoline locomotive.



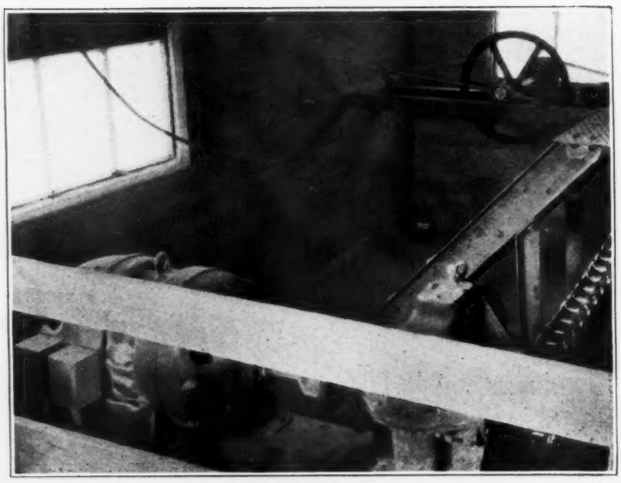
Electric well drill sinking 6½-in. blast hole.

tems feed the cement from either of the stockhouses, from the cement-storage silos, or direct from the Polysius mills, to the packhouse which is located between the stockhouses. No cement is being packed from the mill stream at this time.

The new cement-storage silos which are replacing the old cement stockhouses were erected adjacent to them. There are twelve silos, each 75 ft. high and 30 ft. in diameter which, together with



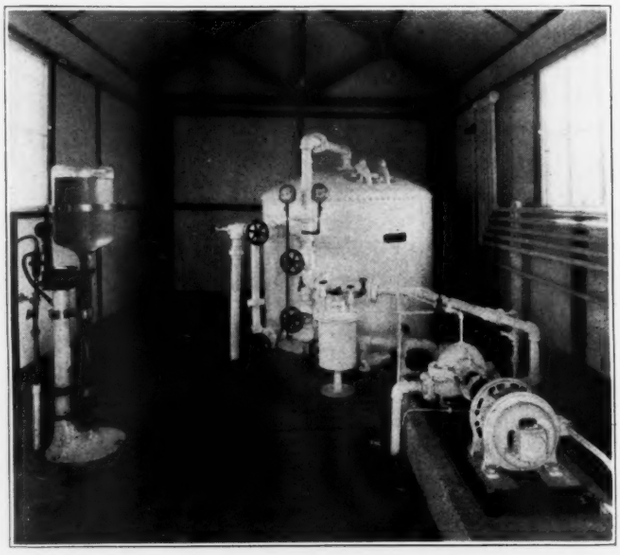
A view of the storage silos which were recently completed.



Speed reducer driving cross conveyor to cement silos.

their six star bins, have a total capacity of 150,000 bbl. They were designed and erected by the Macdonald-Spencer Engineering Co. and were ready for use in July, 1929.

The cement elevator at the silos feeds to a screw conveyor which discharges into one row of four silos and feeds a cross screw conveyor feeding two distributing screw conveyors over the two other



Chlorinating and filtering apparatus for purifying drinking water.

rows of silos. All the screw conveyors are concrete-enclosed and gear-reducer driven, the two side conveyors and the cross conveyor by Falk reducers, and the center conveyor by a DeLaval reducer.

The silos discharge through rack-and-pinion gates into three screw conveyors, one under each row of silos. Each of the conveyors is driven through a Falk gear reducer. They discharge to a cross conveyor and, by a series of conveyors and elevators, to the packhouse. The cement is then sacked by three 4-tube Bates packers.

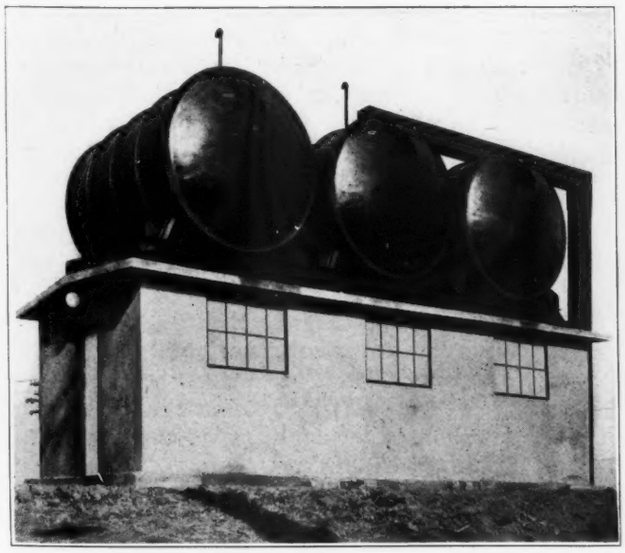
Any surplus cement can be fed either from the

Polysius mills, the stockhouses or the storage silos to a 5-in. Fuller-Kinyon pump in the mill building. This connects with the 5-in. underground pipe-line to Mill B which can discharge into the stockhouse or packhouse there. From 110 to 160 bbl. of cement can be handled per hour. This connection is also an advantage when the demand exceeds the capacity of the packing plant at Mill C.

Coal of low ash content is received by rail from nearby mines and is discharged into a ground-level track hopper. An elevator takes the coal to a 36-in. by 36-in. Jeffrey type A crusher which discharges

Elevator structure and conveyor to building in which clinker and gypsum are proportioned.

by elevator and belt conveyor to open storage of 2,600-ton capacity. This discharges through gates to a screw conveyor feeding rotary coal dryers. Another series of elevators and conveyors feeds three Fuller mills—two 42-in. and one 33-in. A series of elevators and conveyors take the powdered coal to four steel kiln feed tanks. These feed by screw conveyors to the kilns with No. 7 Sturtevant fans furnishing the draft.

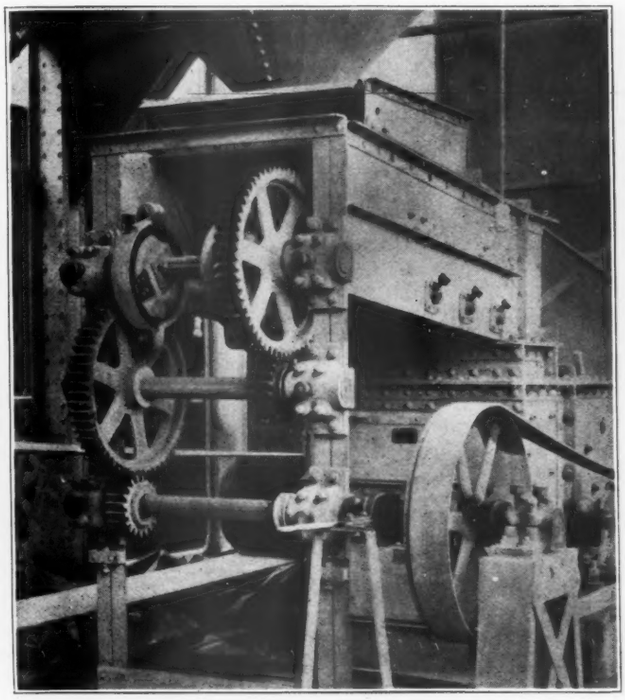


Glass-lined storage tanks above the quarry rest-room.

Loading train of stone at the quarry.

Three large 5-kw. Cutler-Hammer magnets of the same type as those used in the stone house prevent any iron present in the coal from injuring any of the equipment. One of these magnets is located ahead of the crusher and two are ahead of the Fuller mills.

Power is purchased from the Pennsylvania Power and Light Co. at 66,000 volts, 60 cycles.



A close-up view of the hammer mill.

This modern bath-house was provided for the quarry workmen.

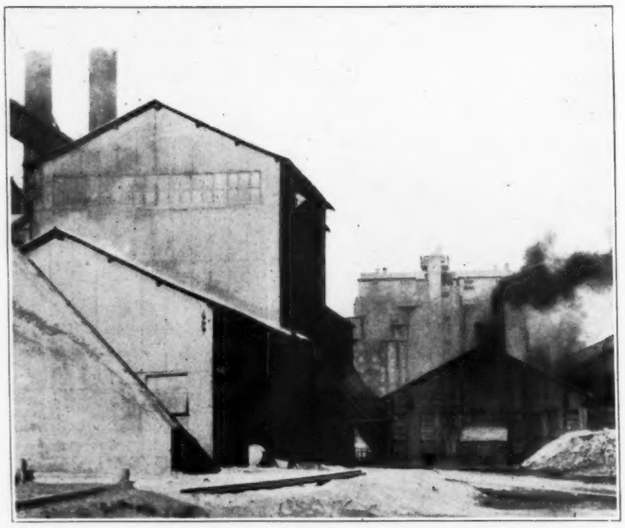
This is reduced by two 3-phase, 5,000-kva. oil-cooled transformers in the power-house to 2,300 volts for distribution to the various departments through lead-covered underground cable. This voltage is used for all the larger motors. Each department has its own transformer for reducing to 440 volts for all motors under 50 hp. The finishing mill also has three single-phase transformers which reduce to 110 volts for lighting purposes. The power-house also has motor-generator sets which generate 220-volt d.c. current for excitation of the super-synchronous motors, for the magnets in the various departments, and for operating the clinker crane and the electric shovel. The plant was changed from 25- to 60-cycle current three years ago.

Most of the 2,300-volt induction motors are controlled by manually-operated starting compensators and the 440-volt induction motors, with the exception of the variable-speed motors, by magnetic starters. The variable-speed motors have drum controllers and resistors. The 600-hp. and 200-hp. super-synchronous motors driving the main grinding units are controlled by automatic panels.

Where such an arrangement was considered advisable, all motors driving various units serving a main grinding machine are interlocked so that there can be no choking of material in case one of the units should stop.

The transformer house, which was built in 1927, is of concrete construction with a cement-tile roof supported on steel trusses. Ventilators provide sufficient ventilation for the self-cooled transformers so that no fans are needed. Two 2,300-volt lines go to Mill B and furnish all the power for operating that plant. Adjoining the transformer and switchboard rooms is a clean, well-equipped first-aid room and hospital.

The office building, a solid stone two-story structure, is located on one of the main highways out of Coplay a short distance from the plant. In addition to the plant offices, which occupy all the first floor and part of the second, there is a chemical laboratory on the second floor and a physical laboratory in the basement. Both laboratories are equipped to make all the tests necessary in a cement plant.

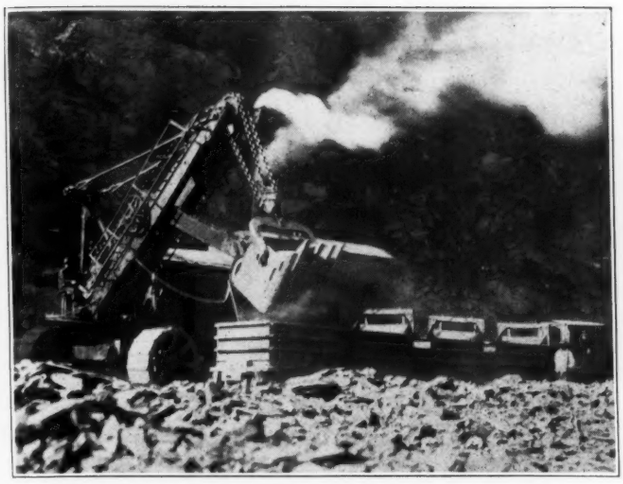


Clinker-gypsum building, clinker silos and coal mill in background.

The main 2,300-volt switchboard.

Among the testing equipment used are an Olsen 20,000-lb.-capacity compression testing machine and a briquette tensile tester of the same make; a Tyler Ro-Tap sieve shaker; a Braun pulverizer; a small jaw crusher and a miniature ball mill of the company's own make. The latter three are all driven from a line shaft by a 5-hp. electric motor. The chemical laboratory contains, among other up-to-date equipment, a Becker Chainomatic balance and a Mullen paper-bag tester made by B. F. Perkins & Son.

Miscellaneous plant buildings include an up-to-date machine and blacksmith shop with a brass



Loading quarry cars with 2½-cu. yd. steam shovel.

foundry in connection. Most of the repair work of the plant is done here. There is also a carpenter shop, a tool-house, a garage, and an electric shop which is fully equipped for rewinding armatures and repairing motors and switches of all types. There is also a two-story concrete building, housing locker rooms, shower baths, and other conveniences for the plant employees. This building was erected three years ago. A concrete road serves all parts of the plant. Two Brown Hoisting Machine Co. steam locomotive cranes in the yards are used for general purposes.

The main office of the Coplay Cement Manufacturing Co. is at the plant. Sales offices are maintained at 521 Fifth Avenue, New York, N. Y.; 1124 Land Title Building, Philadelphia; and 79 Milk Street, Boston.

At a recent reorganization meeting of the board of directors, officers were elected as follows: Eugene Blum, president and chairman of the board; Herbert E. Steiner, first vice-president; Abraham Israel, second vice-president; Lee H. Burton, secretary-treasurer; J. F. Twamley, vice-president in charge of sales; D. J. Uhle, vice-president in charge of operations.

Dr. M. E. Greenwald is research chemist and William J. Johnston is chemist.

Feldspar Finding Important Uses in Ceramic Industries

The chief use of feldspar is as a constituent of both body and glaze in pottery, porcelain, white ware, vitrified sanitary ware, and enameled brick, says the United States Bureau of Mines, Department of Commerce, in a recently issued report. Feldspar constitutes 10 to 35 per cent of the body of vitrified wares, in which it acts as a flux to bind the particles together. Glazes contain 30 to 50 per cent of feldspar. Enamels applied to metals are fused with feldspar. Bath tubs and wash bowls are commonly made of cast iron to which, while hot, an enamel containing much feldspar is applied.

Glass making is another branch of the ceramic industry in which feldspar is used. The feldspar enters into the manufacture of plate, window, and bottle glass as a source of alumina and the alkalies. It is used together with fluorspar in the manufacture of opalescent glass. The composition of feldspar closely approaches that of some types of glass. Furthermore, when a definite combination of aluminum, potash, and silica (as in feldspar) is used, the constituents are assimilated more readily in the melt than if introduced separately. A recent interesting development is the substitution of kaolin for feldspar in glass manufacture. The chief purpose in adding feldspar is to supply the necessary alumina.

Feldspar is also used as an abrasive in scouring soaps. As it is somewhat softer than quartz abrasives it is preferable for use in soaps designed for cleaning glass and enamel-ware surfaces which quartz would scratch. Crushed spar is used in considerable quantities in the form of granules for surfacing prepared roofing, in stucco and pebble dash, and in the facing of cement blocks, particularly those designed to resemble granite. Crushed spar graded in several sizes is sold for foundry facings. A small amount of feldspar is used as a binder in the manufacture of carborundum, corundum, emery, and other abrasive wheels. Small quantities of the purest types of potash feldspar are used in the manufacture of artificial teeth.

Experiments in the recovery of potash from feldspar continue but they have not reached the point of commercial production.

Production of Bauxite During 1929 Reported Slightly Lower

Shipments of bauxite from mines in the United States in 1929 were 365,777 long tons, valued at $2,265,638, a decrease of 2.6 per cent in quantity and of 0.4 per cent in total value, as compared with 1928, according to a statement of the United States Bureau of Mines, Department of Commerce.

In Alabama bauxite was produced in 1929 from the Eufaula and Lennig mines, in Barbour County, and the Davis Hill No. 3 mine, in Henry County. The shipments were 70 per cent more than in 1928, of which about half was shipped for use in the abrasive industry and about half for use in the chemical industry.

Bauxite was produced in Georgia in 1929 at the Dupont mine in Floyd County, and the Lane McMichael mine, in Macon County. Shipments from Georgia in 1929 were 53 per cent less than in 1928, all of which was shipped for use in the chemical industry.

In 1929 bauxite was produced in Arkansas at five mines—the Sweet Home, Dixie No. 2, and Hoekstra mines, in Pulaski County, and the Bauxite and Superior mines, in Saline County. Shipments of bauxite from Arkansas in 1929 were 351,054 long tons, 3 per cent less than in 1928.

Bureau of Standards Reports Results of Investigations on Materials*

Studies Properties of Gypsum, Lime, Slate, Cement, Concrete, and Sand-Lime Brick

THE annual report of the United States Bureau of Standards for the last calendar year, recently issued, is full of interesting information. The bureau was able to accomplish a great deal in the way of important investigations during the year and those portions which deal with some of the materials in the non-metallic mineral field have been condensed and are presented on this and the following pages.

Among the investigations was that on the physical properties of cast stone, started during the previous year, which has been continued. A total of sixty samples of different composition were collected.

There was no change in the test procedure, although two tests showing the absorbing qualities of the materials were added. In the first test the specimens were dried at 65 deg. C. in dry air, instead of the previous temperatures of 105 to 110 deg., boiled five hours and then redried. In the second test the specimens were dried at 35 deg. C. in a current of dry air, and the rate of absorption determined over a period of 48 hours plus 5 hours under reduced pressure, using 300 deg. oil instead of water as the absorbed liquid.

In the first test the absorptions were all less than when the specimens were dried at 110 deg. C., soaked 48 hours in room temperature in water and then boiled 5 hours. This difference is due largely to the difference in drying.

In the second test it was found that, in all but one instance, at the end of 48 hours absorption appreciably more water had been absorbed than oil, both absorptions being expressed on an equal weight-percentage basis. The total percentage of oil absorbed ranged from 2.4 to 13.4 as compared to 4.1 to 18.2 for water. The pore space in commercial cast stone is of considerable volume and can be occupied by a relatively large amount of free uncombined water.

Waterproofing Concrete

The number of different waterproofing agents for concrete has increased many fold in the past few years and, since it is important that only materials possessing some real merit should be used, the Bureau made tests to determine their efficiency.

Fifty integral compounds that are sold on the open market were put under test. These tests were made on specimens of 1:3:6 concrete to which the waterproofing compound has been added. The specimens are made by putting the treated concrete in a galvanized-iron cylinder mold 5 in. in diameter. Around the outside of this 5-in. mold, an iron ring 7 in. in diameter and 2 in. high is placed and the space between the two molds is filled with a 1:2 cement-sand mortar. The inner mold is removed and the specimen given thirty ⅛-in. drops on the flow table. This tends to bond the mortar and concrete so there will be no leakage down the sides of the concrete portion of the specimen. After 7 days' curing in the damp closet these specimens are bolted between two pipe flanges and 20 lb. of water pressure is applied. The amount of water coming through the specimen in a certain time is recorded and this is used as a measure of the permeability. The test pieces are kept under a constant water pressure of 20 lb. per sq. in. at all times, and readings are being taken at regular intervals for one year. Specimens of concrete of the same character, but without any waterproofing, are tested at the same time, so comparisons can be drawn.

Another type of waterproofing that is used to a great extent is the exterior coating compound. Fifty of these coatings were obtained from the various manufacturers and are still under test. The method of testing these is merely a prolonged absorption test.

Cement Reference Laboratory

The cement reference laboratory was recently established at the Bureau under the sponsorship of Committee C-1 on Cement of the American Society for Testing Materials, for the purpose of promoting improvement and uniformity in the methods of testing cement. The work thus far has been largely of a preliminary nature, although the actual field inspection of cement-testing equipment and methods has been commenced.

As a basis for standardization of equipment, tolerances were selected as appropriate for the apparatus and methods involved, and these tolerances have been proposed by Committee C-1 as a tentative amendment to the standard specifications for cement of the A. S. T. M. Equipment has been purchased with which to examine apparatus for compliance with these tolerances, and most of the personnel has been secured.

Even this preliminary work has been of value, since it has called the attention of this laboratory to many points of interest in a later consideration of the variables affecting the tests, and in planning improvements in apparatus or methods. The consideration of tolerances alone brought out the fact that some of the apparatus was of a type not

* Publication approved by the Director of the Bureau of Standards of the U. S. Department of Commerce.

heretofore covered by any definite specifications, and that but little study had been made of the question of appropriate requirements.

The few inspections already made in the field have been productive of interesting data, not only as to apparatus, but particularly as to methods, conditions, and questions of differences in applying specifications. Since the work is purely cooperative, with no compulsory or confiscatory features, it seems that the laboratories may be expected to continue their present attitude of friendly and interested participation in studying conditions and questions.

The laboratory work of instruction has not been started, and this, together with comparative tests carried out with other laboratories, will be deferred until improvements in equipment are completed and a larger number of data secured from the field.

Gypsum-Fiber Concrete

Gypsum-fiber concrete is a concrete which contains calcined gypsum as the cementitious material and a light material, usually planer shavings, as the aggregate. It is used for poured-in-place floors and roofs, where its lightness, quick set, and fireproofing qualities are desirable. In co-operation with the Gypsum Industries Association, the bureau has been developing the data necessary for computing the allowable working stresses on the concrete. Two types of calcined gypsum, representing the extremes of quality commercially obtainable, were used in the investigation. The wood-chip content of the concrete was varied from 0 to 12½ per cent. The amount of mixing water was varied over the ranges which would be usual in commercial practice.

The results indicated that gypsum-fiber concrete with 3 per cent of chips, when dried to constant weight in a gas-fired oven at 100 deg. F., had a compressive strength of from 800 to 1,300 lb. per sq. in. With 12½ per cent chips, dried under similar conditions, the compressive strength was from 450 to 600 lb. per sq. in. Specimens tested after storage for three months at 70 deg. F. and 80 per cent relative humidity showed strengths averaging 77 per cent of similar oven-dried specimens.

As part of the program for determining the volumetric changes which gypsum-fiber concrete undergoes, both during and after setting, the expansion during setting has been measured. Five types of calcined gypsum have been used in this investigation, rotary-calcined stucco, gauging plaster, tube-milled stucco, kettle-calcined gypsum, and precipitated gypsum. Each of these has been mixed with various amounts of commercial wood chips and water, and the expansion during setting has been measured. The expansion varied from 0.08 to 0.30 per cent.

Soundness Tests for Lime

The soundnesss of lime is one of the important properties of the material, determining as it does whether the plaster will "pop" or "pit" when applied to the wall. The present laboratory method for determining the soundness of lime, adopted as standard by the Federal Specifications Board and by the American Society for Testing Materials, requires three days for completion of the test. Because of the amount of time consumed in the test, the method is undesirable. The bureau has been investigating other methods for determining the soundness of lime in order to shorten the testing period. A method which gives promising results consists of making a putty of the lime to be tested, adding to this putty some calcined gypsum, and then spreading the putty on a porous porcelain plate. When the gypsum has set, the plate is placed in an autoclave and steamed under pressure for about three hours. Unsoundness is evidenced by popping or pitting of the plaster on the plate. The results of the tests are being checked by panel tests. Panels 12 in. by 15 in. are made, and the lime being tested is used in the finish coat. The panels are allowed to age in the laboratory air and are examined monthly for defects. The results obtained thus far indicate that steaming for three hours in the autoclave at 125-lb. pressure more closely represents the results obtained on a six months' exposure of the panels than does any other method for determining unsoundness which has been tried in this investigation.

Hydrated Lime

The distribution of particle sizes in hydrated lime has, in the past, received little attention. This is unfortunate, inasmuch as the size of the lime particles probably controls, to a large extent, the other properties of the lime. The bureau, in an attempt to determine the particle size, has constructed a sedimentation apparatus which is capable of giving the desired results. A few preliminary experiments have shown that hydrated lime consists of a mixture of particles from 74-micron diameter (No. 200 sieve) down to 1 micron or less. The size-distribution curves thus far obtained show a fairly uniform distribution, all sizes between 74 and 20 microns appearing in about equal proportions. In the region between 20 microns and 1 micron, a decided maximum occurs in the distribution curve indicating that the majority of particles are found within a narrow size range. The maximum occurs at different particle sizes, for different limes, indicating that it may be a characteristic of the lime. The investigation is being made to determine the relations which exist between the particle-size distribution and the other properties of the lime.

Sand-Lime Brick

Sand-lime brick is used to an appreciable extent for construction in various localities. As the factor of main importance in masonry construction is strength, it is desirable to know what strength may be expected from the commercial brick. Lots of 40 bricks each were obtained from 27 different manufacturers. The absorption, transverse strength, compressive strength flat, and compressive strength on edge were determined on each

brick. The absorption averages for 40 bricks, on 5 hours' cold, total immersion, ranged from 8.3 to 15.5 per cent; on a 5-hour boil, from 13.3 to 21.6 per cent. The modulus of rupture ranged from 334 to 930 lb. per sq. in., and the compressive strength flat ranged from 2,150 to 5,500 lb. per sq. in. Five manufacturers produced brick with a modulus of rupture of less than 450 lb. per sq. in.; ten produced brick with a modulus between 450 and 600 lb. per sq. in., and twelve produced brick with a modulus of over 600 lb. per sq. in. The results showed that practically no relation existed between the various strengths of individual bricks, even when only those of one manufacturer were considered. Considering the averages obtained for each make, however, fairly definite relations were obtained. An additional lot of ten bricks from each manufacturer was obtained. The absorption characteristics of each brick have been determined. These bricks are to be subjected to freezing and thawing as an accelerated weathering test.

Slate

The research concerned with the physical properties of slate embraced studies on 60 samples from Maine, Vermont, New York, Pennsylvania, Maryland, Virginia, Georgia, Tennessee, and Arkansas. Approximately 3,000 tests were completed and then indicate the following values:

	Highest	Lowest	Average
Modulus of rupture (*lb. per sq. in.*)...	16,160	3,380	9,340
Modulus of elasticity	18,400,000	7,400,000	13,400,000
Toughness (maximus deflection for 15.5-in. span and $\frac{1}{16}$-in. thickness)	0.240	0.081	0.145
Abrasive hardness	15.2	6.2	8.3
Absorption (*per cent by weight*)	1.63	0.10	.27
True specific gravity	2.90	2.77	2.78
Bulk specific gravity	2.87	2.74	2.76

Weathering tests have consisted of determinations of the effects of frost action and the action of dilute acids. Some of the samples have been subjected to more than 4,000 freezings in a water-soaked condition and the results indicate that frost action on this material forms only a minor part in the weathering process. The deterioration caused by the acid condition of rain water is probably of more importance, and attempts to simulate this effect have been made by immersing specimens in a one per cent solution of sulphuric acid for 20 days, after which strength determinations were made. The results of such tests indicate that some slates are quite appreciably attacked by acids, the action being shown by color changes and softening for a small depth below the surface. The color changes appear to bear no relation to color changes which occur when slate is exposed to the weather, and there is considerable doubt as to whether such tests cause the same type of decay as that resulting from actual exposure to the weather. In order to obtain more information as to what happens in the weathering of roofing slate a comprehensive study of slate shingles which have been in service for a long period of time has been undertaken. The co-operation of a large number of slate producers has been secured, and old buildings in various parts of the country are being sampled. It is hoped that the study of these samples by microscopic and chemical means as well as physical tests will lead to a better understanding of the weathering processes and enable the laboratory to establish a satisfactory basis of determining weathering qualities.

Weathering Characteristics Subject of Intensive Research

The Co-ordinating Committee on Weathering Characteristics held its second meeting at the National Bureau of Standards, Washington, D. C., on April 3, 1930. The status of research on weathering in various committees of the American Society for Testing Materials was presented by members representing the committees concerned, and investigations at the Bureau of Standards on concrete aggregates, cast stone and slate were reviewed.

In the general discussion of weathering tests, as reported by D. W. Kessler, chairman, U. S. Bureau of Standards, attention was called to various exposure conditions arising in different types of structures or in different parts of the same structure, and to the desirability of varying test conditions to afford information of value for the different exposures. Practical observations of value were brought to light on the better adaptability of certain masonry types to continually-damp conditions, such as retaining walls or the lower courses in buildings, than to conditions of varying moisture, while other masonry types give the opposite results. Laboratory tests which indicated that concrete deteriorates more rapidly in the freezing test when subjected to an occasional drying than if maintained in a wet condition throughout were described. It was, therefore, decided that the effects of varying-moisture conditions should receive more attention in weathering tests.

Considerable evidence was presented in support of a theory that some materials decay from mineral alterations within, by an action which is independent of the usually conceived weathering agencies. Such cases seem to require only moisture and heat conditions similar to those normally present in service exposures, while the effects of frost, acid atmospheres or contamination from leaching waters may be insignificant.

This meeting of the committee was apparently quite successful in stimulating interest in the subject of masonry weathering and weathering tests and through the exchange of ideas, no doubt, some progress has been made towards the purpose of co-ordinating the viewpoints of committees concerned with different materials. The complexity of the subject and evident lack of definite knowledge as brought out in various phases of research, as well as by practical observations, indicate that the subject is worthy of the best efforts of the committee.

Produces and Delivers 3,700 Cubic Yards of Central-Mixed Concrete a Day

Philadelphia Firm Operates Three Plants and Fleet of 68 Agitator-Body Trucks

TWO rivers and the fortunate choice of a city the size of Philadelphia have been important factors in bringing the Warner Co., to the front rank among materials producers in the United States. But these factors alone cannot claim the credit. Organization, co-ordination, and efficient equipment have been the vital points in Warner success. Each division of the entire organization knows its daily job and is flexible enough to handle unexpected details.

Co-ordination has become more important than ever since this company started to produce and deliver central-mixed concrete to Philadelphia contractors. And now, with three plants having an estimated total capacity of 3,700 cu. yd. daily, co-ordination is vital.

Central-mixed concrete is not a commodity that can be produced for stock and delivered at the producer's convenience; each load must be mixed, loaded and transported to order.

To supply a rapidly increasing demand for central-mixed concrete and to deliver a certain mix at a specified time regardless of obstacles Warner Company has built up an elaborate organization, three completely equipped plants, and a fleet of 68 Clinton conveyor agitator trucks. Their general material-supply business operates side by side with the central-mixed concrete business.

Sand and gravel are towed down the Delaware River in barges from the Warner pits. Two hundred barges and eight tugs are used in this traffic. The tugs are steam-powered with the exception of one which carries Diesel engines.

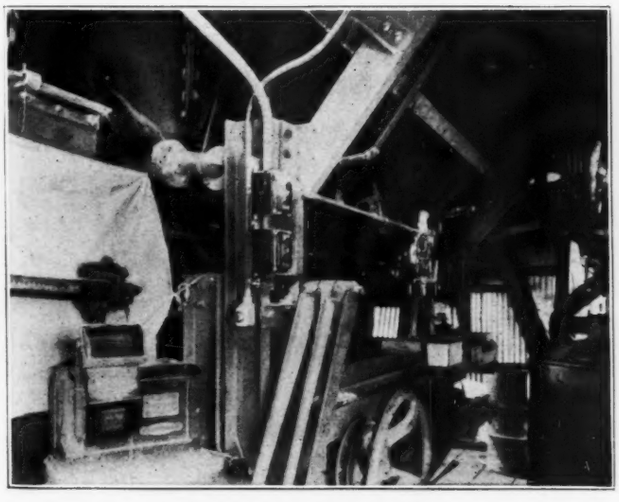
All barges are stopped at the Berks Street yard for distribution among the various yards throughout the city. Sufficient barges are held at Berks Street to supply the mixing plant and dry-materials yard there with enough aggregates. The rest move on down the Delaware to the other yards—some traveling up the Schuykill to the Christian Street plant. Water transportation direct from the gravel beds to the yards has effected large savings in the cost of aggregates.

The Christian Street yard and mixing plant is typical, in organization and equipment, of the three Warner central mixing plants.

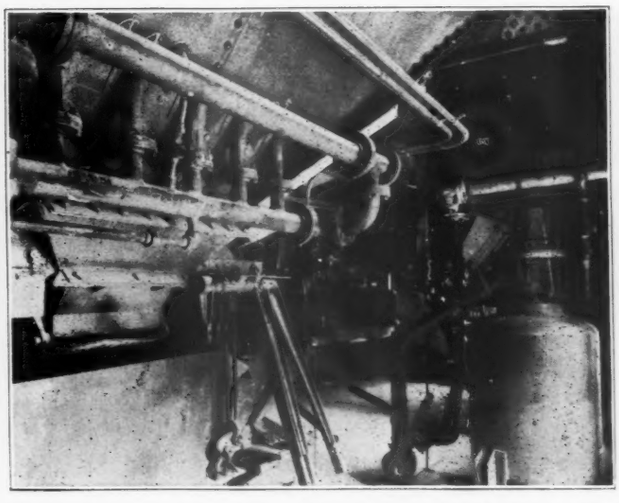
Cement arrives by rail in bulk. When it is unloaded it discharges from the car into the two Lattimer screw conveyors. Cross conveyors pick it up from these and discharge it into the Fuller-Kinyon pumping system. Ordinary box cars are unloaded into the conveyors by hand shovels.

A two-way valve permits the cement to be pumped either to the two-car-capacity storage silo or, for a distance of 250 ft., direct to the batcher bins. A by-pass air line is installed to break stoppages in the system by reversing the air through application at the delivery end. The compressor will develop 100-lb. pressure, but 60-lb. has been found to be the most practical normal operating pressure.

Sand and gravel are unloaded from barges at the Christian Street yards with a Lambert crane equipped with a 2-cu. yd. Hayward clamshell bucket. They are deposited in piles, from which they are carried by a conveyor with a belt 670 ft.



Equipment for weighing materials and measuring water in Berks Street plant.



Materials and water are proportioned at this station in Christian Street plant.

Concrete mixer at Christian Street plant dumping batch to truck.

Fleet of open and special concrete trucks at Berks Street plant.

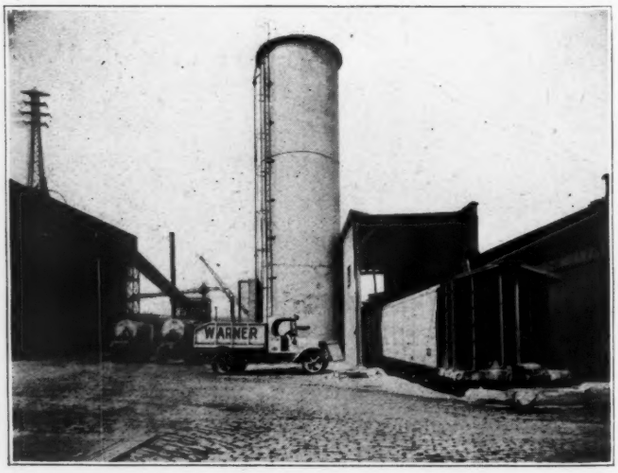
long and 30 in. wide, to the fifteen storage bins. A tripper moves along rails to discharge the material at the proper bin.

These bins can be discharged into open-body dump trucks for delivery, or to the three conveyors which elevate the material to the batcher bins. One 36-in. belt serves the T. L. Smith batcher and mixer, and two 30-in. belts supply the Blaw-Knox batcher for the Ransome mixer.

Three bins totaling 300 tons' capacity are provided for each batcher. One supplies sand, another ¾-in. gravel, and the third 1½-in. stone.

Both batchers are one-man operated and are equipped with two Howes Weightographs each. Sand of the required amount enters the batcher first. Stone is dropped in proportion into its separate compartment. Cement is weighed separately at the same time on another Weightograph, and the batch is discharged into the mixer below.

Water for the Blaw-Knox batcher is accurately measured by means of a Whitlock calibrated tank, which automatically fills to the required level or discharges any excess into a waste line. The right amount goes directly to the mixer. A Ransome calibrated tank serves the other mixer with equal precision. The Ransome and Smith mixers are of 2-cu. yd. capacity each.



Yard at Christian Street plant, mixing building at left.

The moisture content of the sand and stone is given careful consideration in every batch. Tests made every hour keep the mixer operators constantly informed, and charts are provided in each mixing room to give them the proper proportions of water to be added to each mix. As the moisture content of the aggregates increases, the amount of water in the mix is reduced.

The mixers are rotated for 1½ minutes for each batch. A warning bell rings automatically at the end of that time, the operator discharges the mix into a waiting Clinton conveyor-conditioner truck below, and the concrete is ready for delivery.

Throughout the trip to the job the barrel body of the truck is rotated, bringing to the surface all air bubbles drawn into the concrete in the mixing process and providing a stronger, more closely and evenly distributed concrete. All the Clinton conveyors are of 3½-cu. yd. capacity and are usually operated under that load. However, frequently orders for smaller amounts are delivered in the same trucks.

For a full load two batchers are required. The time required for batching, mixing and loading a truck to capacity is 4 minutes. Delivery has been made to points 12 miles from the plant.

An elaborate testing program has been instituted to insure a product which will meet the most rigid specifications. To answer questions which naturally arose from architects, engineers, and contractors when the radical change to central mixing came about, the Warner Co. engaged, under contract, the independent engineering organization of E. L. Conwell & Co. to serve as inspectors of every process in the production and delivery of the concrete.

A Conwell inspector remains constantly in every mixing room, noting the figures on the Weightographs and calibrated water tanks, and checking them against the proportions on the orders. Temperature tests are made regularly on the mix throughout the fall and winter months. Steam jets

heat the water in the tanks and in extreme weather heat the aggregate in the batcher.

Conwell inspectors follow the trucks to the job, taking samples and making tests as the mixes are discharged at delivery points. Through inspection of this kind, the Warner Co. has gone far, in a short time, toward overcoming the skepticism of some conservative builders for centrally mixed concrete. Each of the three Warner mixing plants is served by this inspection and testing service and all are planned almost identically in layout and equipment.

The Berks Street yard, which is the largest with a daily estimated capacity of 1,750 cu. yd., has three mixers. At this plant the aggregates are unloaded from barges by a McMyler-Interstate crane. The main conveyor was designed by Warner engineers, and comprises parts bought from various manufacturers. Two 2-cu. yd. Ransome mixers have been operating since the plant opened and a 3-cu. yd. T. L. Smith mixer was added recently. At the Tyson Street yard a 2-cu. yd. Ransome mixer is handling the estimated 500-cu. yd. daily capacity.

None of the plants have yet been forced to capacity production, but the Christian Street yard has delivered 800 cu. yd. in one day without difficulty. This approaches its estimated 1,000-cu. yd. capacity.

Year-round service has been maintained at all three plants. A steam system, with jets at strategic points to heat aggregates, cement and water when there is danger of freezing, keeps things moving.

A problem which threatened to become serious began to appear when the demand for central-mixed concrete increased. This was the problem of peak loads and slack hours. Too many contractors ordered concrete for delivery at the same hour. At certain times 500 trucks could not have filled all the orders. At other times 30 or 40 trucks stood idle in the yards.

With characteristic thoroughness the Warner Co. instituted an educational campaign among its

Pouring Warner concrete direct to forms for new bridge.

customers. Salesmen worked with contractors and engineers, helping them to plan ahead in order to place their orders three or four days in advance.

It was not difficult to show the customer how he would benefit both in better service and in better concrete if he would do this. However, there is even now a small but regular demand for a yard or two of concrete on a half-hour's notice.

The complete flexibility of the three plants and the entire organization has gone a long way toward solving these problems.

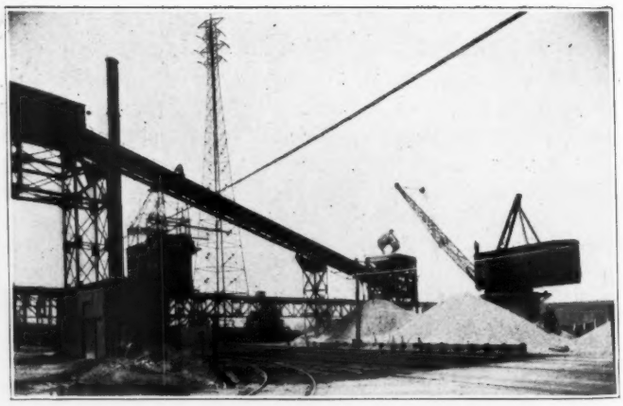
All orders, whether received by salesmen, telephone or mail, go to the central order department at the Berks Street yard. There assignment of orders to all three plants is made by teletype. This instrument, operated like a typewriter in the central office, prints the message simultaneously on a tape in each of the other yard offices. In this way a printed order is instantly in the hands of the plant assigned to fill it, eliminating the possible error in telephone orders or the delay of messengers.

Complete details go over the teletype, including proportions of the mix, quantity, destination and time of delivery. Speaking tubes connect the yard

Crane at Berks Street plant unloading aggregates to elevator of local design.

Open truck at Christian Street plant receiving batch from mixer.

Unloading barge at Berks Street plant; stockpiles at right, plant in background.



Crane at Christian Street plant feeding aggregates to plant conveyor.

offices with their respective mixing rooms. In this way an order can be received, transmitted to the plant, put in production, and the loaded conveyor truck started to the destination in five minutes.

Though the Warner Co. has been producing ready-mixed concrete only two years, the company has a history equalled by few in the United States. Started in 1794 by John and William Warner, the company has come down through their heirs to the present day. It is now under the direction of Charles Warner, who is a direct descendant of the founders. His son, recently graduated from Haverford College, is now studying the business.

Besides the tremendous new volume of business in ready-mixed concrete, the company has even larger interests in sand, gravel and lime. Complete in every detail, it operates its own pits, ships on its own barges, distributes through its own yards, mixes materials of its own production (excepting cement), delivers concrete to the job, often even pouring it from the Clinton conveyor-conditioner trucks.

This company supplied central-mixed concrete to the New York contracting firm of Heyman & Goodman which has completed the new South Broad Street subway of Philadelphia, and it is now engaged in delivering ready-mixed concrete to the new $5,000,000 Philadelphia Convention Hall.

Bins and mixer building at Berks Street plant.

Half of Barite Produced in U. S. Mined by Hand Methods

The mining of barite in the United States is carried on by three distinct methods, according to the United States Bureau of Mines. Surface mining by hand predominates in the Missouri district; mechanical mining on the surface is employed in Georgia and Tennessee, and underground mining is conducted in California.

Practically half of the barite mined in the United States is produced by hand-mining methods. In Missouri, where this method is used very extentively, the miner's tools comprise a pick and shovel, a small hatchet, a hand windlass, a rope and bucket, and a rattle box, or cradle screen. The miner selects a location, upon which he sinks a pit or shallow shaft from 3 ft. to 5 ft. in diameter. The pit may be circular, but, if the shaft is cribbed, the upper part is usually square. The pit is very seldom sunk too deep to permit the miner to throw out the dirt by hand. If he can not throw out the dirt he must have someone to work the windlass. On the surface the dirt is worked over by pick and shovel, the lumps of barite are sorted out, and the larger pieces are cleaned of the adhering clay with a hatchet. Should the orebody be of sufficient size and show a tendency to branch out, drifting is carried on until the ore runs out or the roof caves in. When this occurs, or bedrock is reached, another pit is started, often within 8 ft. or 10 ft. of the first and in the direction of the best ore. Drifts from one pit often lead into those from an adjacent one. The pits may be anywhere from 4 ft. to 30 ft. deep, but generally average 8 ft. to 12 ft.

Commercial Standard Classifications Are Adopted by Feldspar Producers

Cover Ground Material as Classified; Not a Definite Purchase Specification

AT A GENERAL conference of producers, distributors, and users of feldspar held January 14, 1930, in the Bureau of Standards, Washington, D. C., some differences of opinion were indicated regarding the commercial standard as presented but those present reiterated their desire for a standard classification for the benefit of all concerned.

A committee representative of the industry was appointed to complete the formulation of a commercial standard on the basis of that submitted by the Feldspar Grinders' Institute to be later submitted to the industry for formal approval.

The committee met in Toronto, Canada, on February 18 and decided upon a recommended commercial standard classification which, upon request, was submitted to the Chemistry Division of the Bureau of Standards for correlation and adjustment of the methods of chemical analysis. This has been done and the recommended standard is being circulated for the approval of the industry.

It was decided that the commercial standard classification will be effective three months after announcement of the success of the project, following receipt of a satisfactory majority of acceptances.

The standardization committee will continue as the standing committee of the industry to consider annually the need of revising the standard.

The personnel of this committee is as follows:

B. C. Burgess, Chairman, Tenn. Mineral Products Co.
Chas. E. Golding, Standard Flint & Spar Corp.
V. V. Kelsey, Consolidated Feldspar Corp.
Joseph P. Rodgers, Seaboard Feldspar Co.
Arthur S. Watts, Ohio State University.
P. H. Bates, Bureau of Standards.
James Hamilton, Trenton Potteries Co.
Edw. Schramm, Onondago Pottery Co.
L. E. Barringer, General Electric Co.
F. C. Flint, Hazel-Atlas Glass Co.
T. C. Earnill, Owens-Ill. Glass Co.
H. G. Wolfram, Porcelain Enamel & Mfg. Co.
Harry H. Steidle, Bureau of Standards.

The text of the recommended classification is divided into sections. Section I states that

"This commercial standard classification covers ground feldspar used in the production of ceramic products, based on particle size and chemical composition. It is to be regarded as a classification rather than a definite purchase specification."

Section II states that all screen tests shall be made on screens of the U. S. standard sieve series, and Section III contains the following table of acceptable screening analyses.

U. S. Standard Sieve Series Number	Amount Remaining on No. 200 Sieve (*per cent*)	Maximum Percentage on Sieve Designated	U. S. Standard Sieve Series (*opening in In.*)
230	0.00– 0.35	1.0	.0024
200	0.35– 1.00	1.0	.0029
170	1.00– 2.50	1.0	.0035
140	2.50– 5.00	1.0	.0041
120	5.00– 9.00	1.0	.0049
100	9.00–14.00	1.0	.0059
80	14.00–21.00	1.0	.0070
60	21.00–30.00	0.6	.0098
40	30.00–42.00	0.3	.0165
20	42.00–62.00	None	.0331

This fineness classification shall be made on a basis of the percentage remaining on the standard 200 sieve and that remaining on the sieve designated. Example: 140 sieve product will have 2.5 to 5.0 per cent remaining on the 200 sieve and less than 1 per cent on the 140 sieve.

Section III includes also the chemical classification, based upon composition as it influences use, and describes three groups.

The *first* group includes the commonly accepted ceramic or body grades based on silica content and alkali ratio and containing less than 4 per cent soda (Na_2O) content. The numbers designated are for the purpose of illustration and the various groups may be added to up or down the scale to provide for all commercial grades of feldspar. The silica number and ratio numbers are to be used in combination. For example: Grade No. 67-51 designates a spar of silica content 66.00 up to 67.99 per cent, and with 5 or more parts of potash (K_2O) to 1 part of soda (Na_2O).

Number	Silica (SiO_2) Content
65	64.00-65.99 per cent
67	66.00-67.99 per cent
69	68.00-69.99 per cent
71	70.00-71.99 per cent
73	72.00-73.99 per cent

Number	Potash (K_2O)—Soda (Na_2O) Ratio
61	6 or more potash to 1 soda.
51	5 potash to 1 soda up to 6 potash to 1 soda.
41	More than 3 and less than 5 potash to 1 soda.
31	3 or less potash to 1 soda.

The *second* group includes the spars used chiefly for glazing purposes, which are based on soda content and contain 4 per cent or more soda (Na_2O).

Number	Soda (Na_2O) Content
4	4.00-4.99 per cent
5	5.00-5.99 per cent
6	6.00-6.99 per cent
7	7.00-7.99 per cent
8	8.00-8.99 per cent

The *third* group includes the spars used for glass making purposes and are based on silica, alumina, and iron content. The numbers are to be used in combination. For example, grade 69-17-X represents a grade of spar of 68.00 to 69.99 per cent silica, 17.00 to 17.99 per cent alumina, and with a maximum of 0.15 per cent Fe_2O_3 content.

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Number	Silica (SiO_2) Content
65	64.00-65.99 per cent
67	66.00-67.99 per cent
69	68.00-69.99 per cent
71	70.00-71.99 per cent
Number	**Alumina (Al_2O_3) Content**
15	15.00-15.99 per cent
16	16.00-16.99 per cent
17	17.00-17.99 per cent
18	18.00-18.99 per cent
19	19.00-19.99 per cent
Number	**Iron (Fe_2O_3) Content**
X	A maximum of 0.15 per cent
XX	A maximum of 0.20 per cent
XXX	Above 0.20 per cent.

Section IV is divided into two parts. The first part describes the physical test of the material for fineness, as follows:

A 100-gram portion of the dry sample is weighed out to an accuracy of 0.1 gram. It is then transferred to the 200-mesh sieve over a sieve-pan which fits closely. The pan shall contain sufficient water to reach within not less than ¼-in. nor more than ¾-in. from the top of the pan. The sieve and pan shall be vibrated or shaken in such a manner that water in the pan is splashed on the screen from below, so as to wash the powder about and cause the material that can pass through the sieve to pass into the pan below. This treatment shall be continued until no appreciable amount is passing through. The contents of the screen are then washed into a pan and thoroughly dried. The dried material is then placed on the coarsest sieve to be used. The finer screens including the 200-mesh are placed in order of size under the coarsest, the 200-mesh being at the bottom. The tier of screens is then shaken until no more than 0.05 of a gram passes any screen after 1 minute of shaking each time. This point is determined by weighing the residue on the coarsest screen, reshaking for a minute until finished, then going to the next size and repeating the process.

The second part of Section IV is lengthy, going into details of the numerous chemical determinations, preceded by a few explanations as follows.

Feldspar is analyzed for SiO_2, "R_2O_3", "Al_2O_3", Fe_2O_3, CaO, MgO, K_2O, Na_2O, and ignition loss. SiO_2, "R_2O_3", CaO, MgO, K_2O and Na_2O, are determined in 0.5-gm. samples. Ignition loss is determined in a 5-gm. sample. Fe_2O_3 is determined potentio-metrically in a 10-gm. sample and the result is subtracted from the percentage of "R_2O_3" to give "Al_2O_3." The result for the latter will, of course, include constituents such as TiO_2, ZrO_2, P_2O_5 and the like.

Accurate results in the analysis of feldspar are not easy to obtain, especially in the cases of SiO_2 and "R_2O_3". Attention must be paid to all details. Variations in check analyses should be within the following limits: SiO_2, 0.2 per cent; "R_2O_3", 0.2 per cent; CaO, 0.05 per cent; MgO, 0.05 per cent; K_2O, plus Na_2O, 0.2 per cent. Analyses should be repeated if the summation does not fall between 99.75 and 100.5 per cent.

Analyses of potash feldspars should be checked against the Bureau of Standards standard sample No. 70, and analyses of soda feldspars should be checked against the Bureau of Standards standard sample No. 99.

All results should be corrected by blank runs on re-agents, and factors should be calculated from the current International Table of Atomic Weights.

The sample should be ground to pass a No. 100 screen and then well-mixed. All samples for analysis must be taken from material that has been dried to 105 deg. to 110 deg. C.

To determine the ignition loss, a 5-gm. sample is weighed in a 30-ml. platinum crucible. Cover the crucible with a well-fitting cover, and heat for 15 min. at 1,000 deg. C. The heating can be done over a burner or in a muffle and should be sufficiently gentle at the start so that there is no danger of mechanical loss. Cool over a good desiccant and weigh. The loss in weight multiplied by 20 represents the per cent of ignition loss.

Production of Magnesium and Its Compounds in the U. S.

Magnesite, the normal carbonate of magnesium, and dolomite, or high-magnesium limestone, formerly were the only commercial sources of magnesium products in the United States. For many years Germany was the main source of natural salts, found abundantly in the Stassfurt deposits. During the Great War, however, magnesium chloride and sulphate began to be produced as by-products of the treatment of brines in Michigan, and within the last year or two experiments have been made in California to produce the salts from sea water. Recently a deposit of brucite (magnesium hydrate) was discovered in Nevada which may be of commercial importance.

Physical Chemistry of Potash-Bearing Silicates Being Studied

The potash feldspars, greensands and leucites, constitute a group of potash-bearing silicates which provide a practically unlimited potential supply of potash. The fundamental chemistry of these silicates has not been systematically studied. Most of the literature consists of patented processes for the extraction of potash, very few of which are at present economically feasible. The chemical and physical facts which underlie these patents have not been carefully investigated and hence it is not possible to obtain consistent results in testing any of these processes. A study of the physical chemistry of the potash-bearing silicates is now being conducted by the Non-metallic Minerals Experiment Station of the United States Bureau of Mines, Department of Commerce, at Rutgers University, New Brunswick, N. J.

Montana Sand and Gravel Plant Provided With Riffles to Catch Gold

By FRANCIS CHURCH LINCOLN
Professor of Mining, South Dakota State School of Mines, Rapid City, S. D.

AN UP-TO-DATE sand and gravel plant with a capacity of 60 tons per hour has recently been constructed and put into operation near Helena, Mont., by the Helena Sand and Gravel Company. George F. Jacoby, president and manager of the company, is a son of Charles Jacoby of the old firm of Jacoby and Sons, general contractors in Helena since 1882. He is a graduate in architectural engineering of Montana State College, and the work he took for his degree directed his attention to the great importance of good aggregate in concrete. When a disastrous fire occurred in the business section of Helena in July, 1928, George F. Jacoby immediately realized that a large amount of sand and gravel would be needed for the concrete in rebuilding the burned area, so he purchased 36 acres of good sand and gravel deposits from the Montana Testing and Engineering Company, erected a small, temporary plant, and excavated 16,000 cu. yd. of sand and gravel which was used largely in reconstruction and new work. This small plant proved so successful that the Smith Engineering Works of Milwaukee was asked to design a larger and better plant.

George F. Jacoby

The new plant was purchased through the Hall-Perry Machinery Company of Butte, local agent of the Smith Engineering Works. It was erected in two months' time at a cost of about $15,000 and went into operation in August, 1929. Tom B. Brownlow, plant foreman, was associated with Mr. Jacoby in the operation of the old pit and is part owner in the present undertaking. He was formerly a truck operator and sand and gravel contractor in Helena.

A colorful side of the enterprise is the possibility of finding gold as a by-product. Old-timers in Helena assert that the sand and gravel deposit being worked does contain gold, and the present owners found traces of the precious metal at a depth of 35 ft. when deepening their well. The baffle plate which deflects the sand from the gravel washer to the sand tanks has, therefore, been provided with riffles to catch any gold which may occur in the washed material. The pit is at present but 20 ft. in depth, however, and it is not expected that gold will be encountered until the 25-ft. depth is attained.

The new pit and plant are located at Broadwater, 3 mi. west of Helena, on the main highway to Missoula and on the state nursery spur of the Northern Pacific railway. The deposit is an extensive one of glacial origin and of undetermined thickness. The proportions of sand and gravel present are variable but average about 40 per cent sand and 60 per cent gravel. The material is extremely pure, unwashed sand screened from the gravel in the old pit on the property hav-

General view of plant, Helena Sand & Gravel Co.

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Plate feeder, grizzly, and primary crusher.

ing been classed as grade "A" by the Montana highway commission.

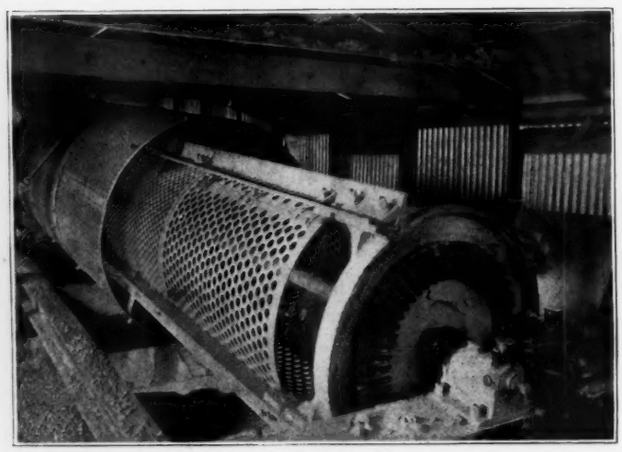
The new pit is at present 20 ft. in depth. The sand and gravel are excavated with a ½-cu. yd. Speeder gasoline shovel, which loads the excavated material into a 4-cu. yd. skip, made by the Caird Engineering Company of Helena. It is of the type used in underground mines. The loaded skip is drawn up an inclined track by means of a steel cable attached to a small second-hand geared electric hoist operated by a 20-hp. motor. It dumps automatically upon a grizzly over the bin at the crusher house, and returns to the pit bottom by gravity.

Power shovel loading 4-cu. yd. automatic-dumping skip.

The grizzly, upon which the skip from the pit dumps, is made from rails laid horizontally across the top of a bin at 10-in. intervals. The size of the bin top is 10 ft. by 10 ft. and the bin has a depth of 5 ft. There are but few boulders over 10 in. in diameter in the deposit to be caught by this grizzly, and those which are caught are thrown over the side of the bin. The material falling into the bin is fed by a 24-in. Telsmith plate feeder to a 3-ft. by 5-ft. Telsmith wedge-bar grizzly with bars spaced 2 in. apart and inclined at 40 deg. The undersize from the grizzly goes directly to a 20-in. Telsmith belt conveyor, while the oversize passes through a No. 10A Telsmith primary gyratory breaker which reduces all material passing through it to 3 in. or less in diameter. The crushed material is then fed onto the belt conveyor, along with the undersize. Crusher and feeder were originally run by a 30-hp. electric motor, but a 40-hp. motor was later found necessary and is now installed.

The 20-in. Telsmith belt conveyor is 214 ft. on centers and carries the material from the bottom of the crusher house to the top of the washer building. There it is fed, with water, into a 18-ft. Telsmith Ajax rotary gravel washer. The washer consists of an inner cylinder 40 in. in diameter and an outer cylinder 55 in. in diameter. The inner

Sand discharging from sand-settling tank.



Revolving and washing gravel screen, discharge end.

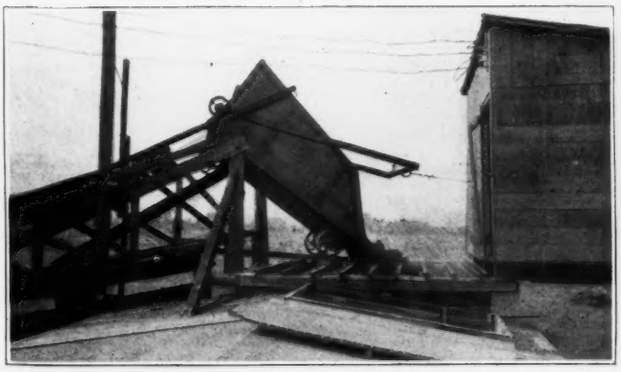
Conveyor to washing screens. Pipe-line from pit at right.

View from top of loading bin toward conveyors and pit.

cylinder, which first receives the material and the water, is composed of a 3-ft. solid scrubbing section, followed by a 4-ft. perforated section with ¾-in. round perforations, a 7-ft. section with 1-in. round holes, and finally by a 4-ft. section with 1½-in., or larger, round perforations as required. The outer cylinder, which encircles the inner 1-in. perforated section, consists of a 6-ft. section with ¼-in. round holes followed and a 4-ft. section with ¾-in. round holes. There are two 3-ft. cleaning rollers on the outside of the ¼-in. section. The washer and the 20-in. belt conveyor are both operated by one 25-hp. electric motor. Water is supplied at the rate of 500 g.p.m. through a 6-in. pipe, by a second-hand 3½-in. centrifugal pump, operated by a 25-hp. electric motor and located at a well on the property a short distance from the pit.

The oversize material from the gravel washer drops to a surge bin over a No. 32 Telsmith reduction gyratory crusher, which can be set to deliver material with various maximum sizes according to the different requirements as specified. The crushed material from this secondary crusher is delivered to a 16-in. Telsmith belt conveyor 84 ft. in length, which returns it to the main 20-in. belt, thus placing the secondary crusher in closed circuit with the gravel washer. The reduction crusher and the 16-in. auxiliary belt are run by a 30-hp. electric motor.

Sand washed from the gravel passes through the ¼-in. perforations in the washer and is deflected by a baffle plate to the sand tanks. These two tanks, a No. 6 Telsmith sand-settling tank and a Telsmith No. 7, furnish coarse and fine sand, respectively. The sized gravels from the gravel washer and the sands from the sand tanks are caught in six shipping bins below. Each bin is 7 ft. by 15 ft. by 15 ft. in size and holds about 60 cu. yd. The bins are arranged in such a manner that their contents may be drawn off either through three duplex and three



Automatic skip, dumping over grizzly to crusher hopper.

Primary crusher discharging to 20-in. belt conveyor.

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Drive side of 32-in. reduction crusher.

simplex bin gates into trucks on a roadway or through six siquad bin gates into railway cars on a spur.

Four men are required to operate the plant, besides the plant foreman. The total horsepower of the electric motors used about the plant is 140, and all were furnished by Westinghouse. High-grade washed gravel of any desired size, and concrete or plasterers' sand, are produced. The location and loading facilities make distribution easy. Consumers of sand and gravel consider this to be one of the best commercial pits in the state.

End view of loading bin, showing gates for loading trucks and freight cars.

Will Report on Non-Metallic Mineral Mining Practices

The publication of a new series of reports which will discuss in detail the mining and development methods employed at representative operations in the important non-metallic mineral industries is planned by the United States Bureau of Mines, Department of Commerce. The preparation of this series of reports was decided upon because of the great interest manifested by the industry in the various reports on mining and milling methods and costs in the metal-mining field which the bureau has been publishing during the past several months.

It is planned first to accumulate general data dealing with the methods of operation at all non-metallic mineral deposits. This information will cover the kind of material recovered and produced for market, the characteristics of the deposits, the amount of overburden if any, and the method of recovery. Information as to breaking, loading, haulage, and treatment methods, and types of equipment used will be obtained.

The next step in the proposed program will be the conducting of special studies of methods employed at certain selected operations. Officials of operating companies will be invited to assist in the program by supplying detailed technologic descriptions of their plants compiled in the form of papers following outlines prepared by the Bureau of Mines. These papers will then be published for general distribution. A study of these papers should enable operators to promote the program of increased efficiency and elimination of waste, which is the prime object of the Bureau of Mines.

The ultimate objective is the accumulation of data on which to base a comprehensive research program in mining methods. This will cover such subjects as stripping surface deposits, drilling problems, and blasting methods. Methods of loading will be compared and the efficiency of various types of equipment discussed. Dredging operations will be studied in detail. The problem of internal plant transportation will be studied.

It is also planned to study the methods of preparing non-metallic materials for markets, including concentration methods and the crushing, grinding, screening, washing, elevating, conveying, and storage of materials.

J. R. Thoenen, mining engineer, will be in active charge of this program in the non-metallic field.

Even the Rock Dust is Marketed in This Missouri Crushed-Stone Plant

Heumader Quarries Employ Gravity as Chief Power Source to Move Material

By HARRY SLOAN

ALTHOUGH the Heumader Quarries at St. Joseph, Mo., are small in size and require comparatively little equipment, they possess several features of interest. William Heumader is a quarryman as a result of conditions and not as a matter of choice. These quarries were driven underground for rock when that method was generally thought to be unsound economically. However, in this instance, gravity, a natural gratuity, is the chief form of power employed in moving the rock from the quarry, through the plant, and into trucks. This quarry requires no pumps to keep the workings dry. Even the rock dust is marketed. These several features, therefore, have resulted in the commercial success of this project.

Mr. Heumader was a contractor in St. Joseph. In his work he found that the rock which he was buying for concrete was not only poor in quality but costly, due to high freight rates from the nearest quarries. To avoid this difficulty, he secured a deposit of suitable rock a few miles north of the city and bought a small crusher with which he supplied rock for his own contracts. He had no intention of becoming a permanent quarryman, but his crushed rock grew in general demand about the city and, to supply that demand, he gradually increased his equipment. He has quit business as a contractor to give his full time to this quarry work.

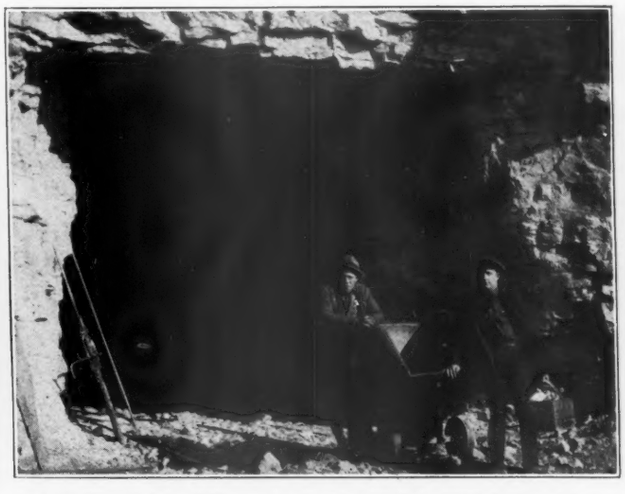
The mouth of the mine—which is really underground—is located on the face of an almost perpendicular hill. There are two ledges of rock—one about 15 ft. in thickness, up toward the top of the hill; and another about 12 ft. in thickness, about half-way up the hill. The hill is so steep that a stone may be tossed from the top of the hill onto the roof of the office building or, by a little more effort, thrown into the Missouri River. The double track of the Chicago, Burlington and Quincy Railroad runs along the bank of the river below the plant.

Due to the steepness of the hill and the height of the ledge of rock, the rock dumped into the crusher hopper passes through the plant to the loading hoppers, and finally into the shipping trucks by gravity, as stated.

The ledge of Bethany limestone which is being worked has a lazy westward dip. Advantage is taken of this dip by tunneling in from the west, thereby obviating any necessity of pumps inside the mine workings to keep them clear of water. Also, by taking advantage of the dip and routing the loaded cars down grade, two men can tram a car of rock, eliminating all haulage machinery.

When this quarry was started, the overburden was stripped from the top layer of limestone and open-pit methods were used. Due to the steepness of the hill, there soon was an excessive amount of overburden which supported large trees and included layers of poor quality gravel and slate, and large rocks. So Mr. Heumader decided to go underground for his rock supply, although quarry-supply salesmen and experienced quarrymen argued something like this: "Bill, you are fixing

William Heumader, owner (right), and R. C. Tracie.



William Heumader and R. C. Tracie at mouth of mine.

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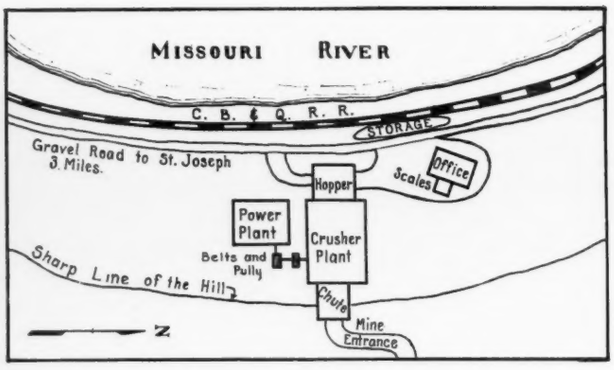
View in mine, Foreman Wilder in center. Main passageways are electrically illuminated.



Plan of Heumader plant, not including mine.

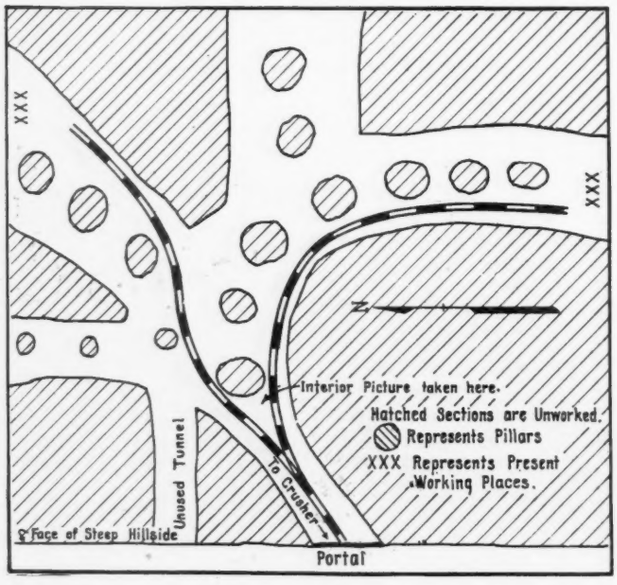
to go broke by using such a method. That just isn't being done in any of the quarries, and you can't do it without a loss." But the method was continued against such expert advice. Now, after four years, during which the underground method has been given a thorough tryout, "Bill" and his bookkeeper, R. S. Tracie, are convinced that they have made a saving by adopting the mining scheme. They believe that this underground mining is superior not only in dispensing with the expensive stripping but that it yields cleaner material and allows year-around work during stormy and wet weather. By being able to assure steady work, they keep a superior class of employees.

About 3 ft. of the ledge of rock is left as a roof to hold up the overlying measures. The mine is roughly divided into rooms measuring about 30 ft. square. At the corners of these rooms, pillars of rock about 15 ft. in diameter are left to support the rock ceiling. Although no roof timbers are used, there has been only one cave-in and it was of no consequence. The workmen underground dress like coal miners but their garments are usually soiled with white stone-dust rather than with black coal-dust. Some of them wear acetylene lamps in their caps. Wooden pegs driven into rock crevices in the roof carry overhead electric wires and lights far back into the quarry.

Heavy pipes provide compressed air from the plant below to the Cleveland and the Ingersoll-Rand hammer-drills. Atlas Powder Company's 35-per cent gelatine is used for blasting. The dynamite blasts break the rock sufficiently small for two men to load it into Easton Car & Construction Co. 1-cu. yd. dump-cars which are trammed out of the mine to the edge of the hill and dumped into the home-made hopper of the crusher house. Light track built in sections which are easily handled may be quickly laid to any new section of the mine. At present the underground workings cover an area equal to about six city blocks.

The power for the plant is supplied by an A. B. Farquhar single-cylinder, 40-hp. engine supplemented by an Atlas, single-cylinder, Corliss, 60-hp. engine for emergency use. The drilling air at 125-lb. pressure is furnished by a Gardner two-cylinder water-cooled compressor. It is equipped with a Protectomotor industrial air filter manufactured by the Staynew Filter Corp., Rochester, N. Y. The 5-kw. generator which supplies the 220-volt electric current was manufactured by the Allis-Chalmers Co.

The Farquhar engine, steam for which is generated in a 90-hp. boiler manufactured by the Pennsylvania Boiler Works, Erie, Pa., drives two Gates gyratory crushers—a No. 3 and a No. 4. Power from the engines is transmitted to the crushers and screens through belting. A heavy-duty revolving screen manufactured by the Smith



Sketch to show underground method of development.

Plant during construction, chute from mine at extreme right.

View of plant from hill above mine, office at right, river in background.

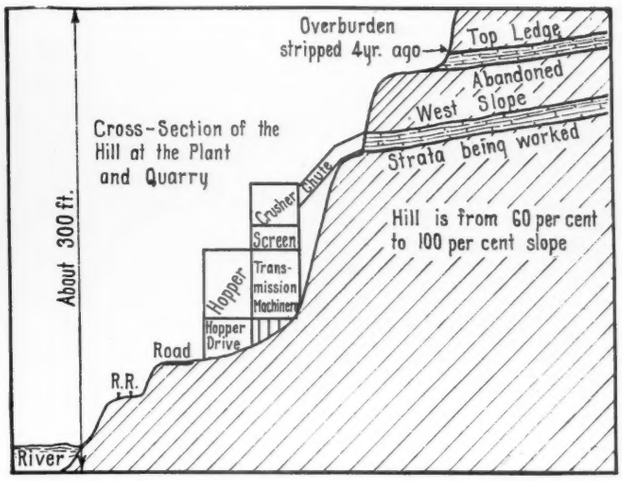
Engineering Works has 4-ft. sections of 1-in., 1½-in., and 2½-in. perforations, respectively. The 1-in. product from the revolving screen passes to a home-made gravity screen of ½-in. mesh.

Although the plant is less than 100 ft. from a railroad, a switch has never been built because the daily output of from 200 to 250 tons is consumed by contractors in Saint Joseph and in Buchanan County. Almost all of the rock is hauled from the hoppers by the customers' trucks. Only one truck, a General Motors, is operated by the quarry owner. Most of the output of the plant is being used by the Consolidated Paving & Material Company and the Land Construction Co., St. Joseph producers of ready-mixed concrete.

James W. Wilder, foreman, showing miner's garb.

During the past four years St. Joseph mill owners have urged Mr. Heumader to produce limestone dust. They had shipped such material in from other quarries to be mixed with their ground feeds. At the Heumader quarry this fine material had been allowed to go to waste because the owner thought that the investment necessary to buy dust-saving machinery would be too great to render the effort profitable. Last October, however, Mr. Heumader installed a Great Western Manufacturing Co. pulverizing mill powered by an International single-cylinder 8-hp. gasoline engine, and then started to supply the millers' demands. Within a month he was producing daily more than 12 tons of 87- to 94-per cent calcium dust and was selling his entire output to the St. Joseph Grain Belt Mills, at the quarry.

The plant produces six classes of material: dust, grit, chat, ½-in., 1-in., and 1½-in. rock. All of this material is weighed on a 33,000-lb.-capacity scale



Vertical section-sketch showing how gravity aids all steps of operation.

manufactured by the Strait Scale Co. of Kansas City, Mo. James W. Wilder is quarry foreman.

View from river, plant in center, adit behind.

Recovery of Potash from Polyhalite an Intricate Process

Polyhalite is a complex compound of potassium, magnesium and calcium sulphates. The mineral dissolves very slowly in water and requires a considerable volume of water for complete extraction of the potash salts. If, however, finely-ground-polyhalite is first calcined so that most of its water of crystallization is driven off, it is possible to obtain more than 90 per cent extraction of the total potash by using 2.3 parts of boiling water. Upon heating powdered polyhalite, vigorous evolution of steam is observed at 300 deg. C. and about 50 per cent of the total water present is given off between 300 deg. and 310 deg. C. Subsequent heating for one-half hour in the temperature range between 430 deg. and 450 deg. C. results in the removal of an additional 48 per cent of the water. The remaining 2 per cent requires a higher temperature or prolonged heating for removal.

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Gypsum Rock Used in New Jersey Plant Comes from New Brunswick

Thermostatic Control Features Drying of Stone and Products

THE GYPSUM rock used at the Newark, N. J., plant of the Newark Plaster Co. comes from the company's mine at Hillsborough, New Brunswick, Canada. As most of the material made at the plant is the finer grades of plaster of Paris, only the purest of white gypsum is desired. For this reason loading in the mine, which is worked by the room-and-pillar system, is done by hand.

The rock is loaded into wooden dump cars which are hauled about two miles to the crushing plant by a gasoline locomotive. The cars are dumped into a No. 16 Traylor gyratory crusher, which discharges onto a ¾-in. mesh stationary screen. The crushed material over ¾-in. is conveyed to two 3,000-ton-capacity concrete silos, from which it is later carried to steamships by two belt conveyors at the rate of 300 tons per hour.

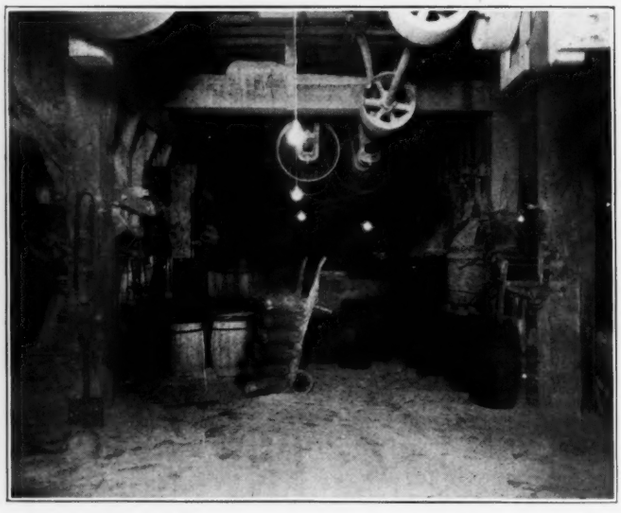
On arrival at Newark, the steamers are unloaded by a Mead-Morrison hoist with a 1¼-cu. yd. clamshell bucket. The rock is then elevated to a trestle from which it is fed through a steel hopper into electric side-dump cars. These are weighed and then discharged into a storage shed which has a capacity of about 20,000 tons.

Crushed rock is loaded from the storage pile by a Barber-Greene stock-pile loader into a Clarke Tructractor. This unloads onto a Stephens-Adamson pan conveyor which discharges into a hopper over a No. 8 Traylor gyratory crusher. This crusher discharges to a belt conveyor feeding a Link-Belt revolving screen, which produces three sizes of material.

The screened material goes by gravity to storage bins above two Raymond low-side 5-roll mills equipped with Raymond kiln dryers. These are driven by 75-hp. motors through Link-Belt silent-chain drives. The kiln system dries the rock during the grinding process by means of air, heated to about 400 deg. F. in three-section Nichols-McCann-Harrison oil-burning heaters. This air current is injected into the mill return air stream by a No. 25 Clarage exhaust fan driven by the same motors which drive small Curtis air compressors supplying air to the furnace burners. These furnaces are of the direct-heat type and very exact automatic air-temperature control is achieved by means of two Foxboro thermostats on each mill. One of these is located in the furnace air duct and the other in the mill separator, where the temperature is kept at 185 deg.

The excess air from the mill stream is vented into two steel expansion chambers and then drawn through two No. 8 Pangborn cloth-screen dust arrestors by a Clarage No. 25 exhaust fan driven by a direct-connected motor. Fuel oil for the burners is pumped by Viking oil pumps to an auxuliary

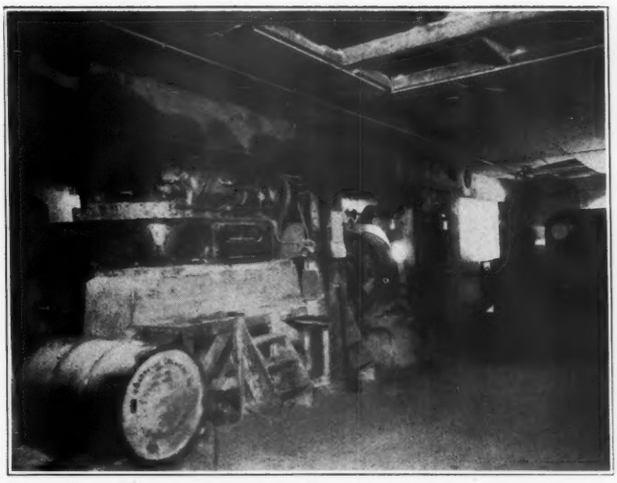
Air compressor, exhaust fan, and grinding mill.



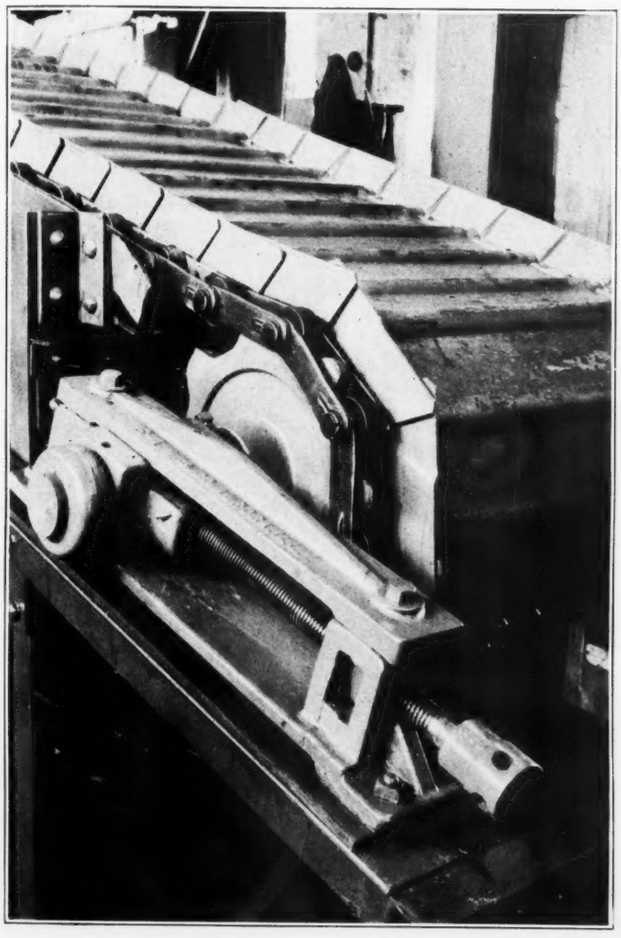
Barrel packers fed by gravity from storage bins.

tank located alongside the furnace. The oil level in this tank is automatically controlled by a float operating the starting switch of the motor-driven circulating pumps.

The ground material in the mills is air separated and delivered by two No. 11 Raymond exhaust fans to two cyclones. The fans are driven through Texrope drives by 60-hp. motors. The material from the cyclones is then delivered by four screw conveyors to steel raw-storage bins with a capacity of about 150 tons. These feed through a series of gates to two screw conveyors, each of which is



Roll mill, motor, oil furnace, oil pump, and thermostats.



Pan conveyor which handles rock from the trucks to the crusher.

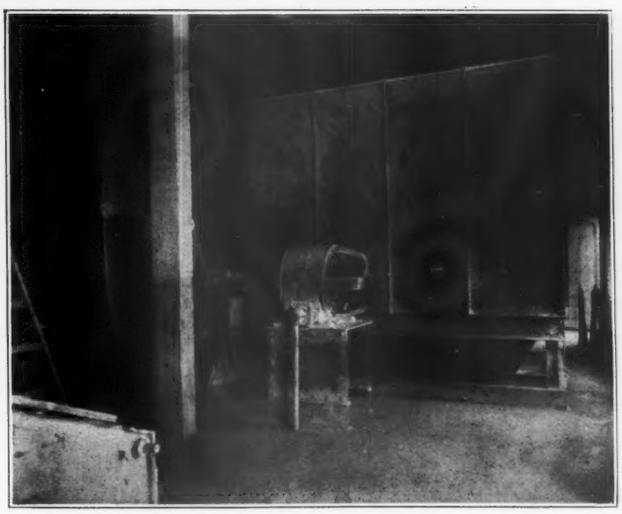
driven through spur-gear speed reducers by a 10-hp. motor.

A comprehensive test of the assemblage of heating, drying and grinding equipment was conducted recently. This involved the accurate determination of the quantity of oil burned, the volume of hot air in circulation, determinations of moisture in material before and after drying, humidity of vented air, and heat-radiation losses. Previous to the installation of the heater, difficulty was experienced by the packing of the gypsum in the bins especially if left over-night or during week-ends. Although air hammers would loosen the material from the steel sides of the bins, the gypsum would stick to the brick wall as a solid mass four or five feet thick and it would arch above the conveyor. Now, with the drying of the gypsum, no trouble of this kind is experienced.

When grinding 7.5 tons per hour, the oil consumption was 14 gal. per hour. The temperature of the gypsum as it entered the Raymond mill was 43 deg., and when discharged to the bins, 180 deg. F. The temperature in the separator was 200 deg. F. The vented air had a humidity of 8.

The screw conveyors feed the material as needed to five Butterworth & Lowe 10-ft. calcining kettles under the bins. These kettles are fired with bituminous coal, four being hand-fired, while the fifth, a more recent installation, is fired by a motor-driven Riley under-feed stoker. The agitating sweeps of these kettles are driven through chain and belt by electric motors, but an auxiliary drive from a small steam engine is provided.

The kettles are vented through steel flues to two By-Products Recovery Co. dust collectors, the gases being drawn through the system and exhausted into the smokestack by two exhaust fans driven



Cloth screen dust collector and its exhaust fan.

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Ten-ft. calcining kettle and underfeed stoker.

through silent-chain drives by a 15-hp. motor. Calcined plaster is discharged from the kettles into separate brick hot-pits, from which it is taken by bucket elevators and screw conveyors to Hum-mer vibrating screens. These discharge into storage bins which feed by gravity to Bates baggers and Howes barrel packers.

Stucco for the gypsum block plant is fed from storage bins by a screw conveyor to an automatic weighing hopper. The batches are dumped as required into a Broughton mixer, which is driven through speed reducers. The necessary fiber and chemicals are added in the mixer, the product going to a Her-Born continuous wet mixer, which feeds a Her-Born block machine. The blocks are discharged to a belt conveyor, from which they are loaded onto steel flat-cars, the units being carefully spaced to insure uniform drying. The cars are then run into drying tunnels, where they pass from a low temperature progressively through higher temperatures until completely dried. They are then removed from the tunnels for storage or shipment.

Mixer that prepared batches of stucco for block plant.

Temperature in the tunnels is automatically controlled by thermostats, insuring uniform drying at the proper speed.

The heated air for the drying process is furnished by a hand-fired coal-burning furnace in which the products of combustion are mixed with the incoming air by a large exhaust-type fan which is driven by a 50-hp. motor through a Link-Belt silent-chain drive.

Power for plant operation is generated by a battery of Coatesville boilers of the return-tube type. A 20-in. by 40-in. by 42-in. tandem-compound Corliss engine drives three direct-current generators which operate the various motors throughout the plant. An auxiliary direct-connected engine generator set is also maintained.

Officers of the Newark Plaster Co. are: Frederick Tomkins, president; Calvin Tomkins, Jr., vice-president; Harry F. Clews, secretary; Franklin H. Miles, treasurer; Joseph W. Gildersleeve, superintendent.

Uses of Graphite Mount Steadily Since World War

Natural graphite is used chiefly in the manufacture of foundry facings, pigments and paints, crucibles, pencils, and crayons, commutator brushes, stove polish, lubricants, retorts, and batteries, says the United States Bureau of Mines in a recently published report. During the last few years the use of graphite in the United States has undergone radical changes. Uses that a few years ago consumed a large proportion of the supply are now relatively of minor importance and uses which were unimportant have become important. Before the World War the manufacture of graphite crucibles consumed more than one-half of the supply; at present this proportion has dwindled to about 13 per cent, while the use of graphite in foundry facings now accounts for 50 per cent or more of the total consumption of the material.

The use of manufactured graphite, started at Niagara Falls, N. Y., in 1897, has developed so rapidly that its production now exceeds the output of natural graphite.

Locate Immense Deposits of Gypsum in Northern Alberta

Last summer's surveys of mineral possibilities of the pre-Cambrian shield in Alberta to the north and west of Lake Athabasca, confirmed the estimate of 217,000,000 tons of gypsum located between Little Rapids and Peace Point, made by the Dominion Bureau of Mines in 1916, according to a report of the survey just issued. Analyses of samples show that they compare quite favorably with other commercially-developed deposits in Canada. It is expected that further work will be done by the Provincial Government in surveying this area during the coming summer.

Cement Mills Throughout U. S. Describe Safety Activities for 1930

Great Interest in Accident-Prevention Work Indicated by Companies' Programs

SOME time ago the Portland Cement Association sent a letter to each of its member companies' mills, with the simple inquiry, "What are your safety plans for 1930?" The replies explained splendid safety programs which have been somewhat condensed and reproduced in the March-April issue of the Association's ACCIDENT PREVENTION MAGAZINE from which the accompanying excerpts are taken. The practices apply, it is true, to cement plants only, but they include many ideas which could be adopted to advantage by the safety officials of all other kinds of non-metallic mineral plants.

It is interesting to note the variety of schemes that have been evolved by safety directors to obtain and maintain the cooperation of their employees in this humanitarian movement.

Safety work in the Lehigh Valley Mills of the Lehigh Portland Cement Co. as reported by C. P. Benner, district safety inspector, is under the direction of mill safety committees which include the foremen and department heads, together with the plant doctor and nurse. Monthly meetings of these committees are conducted with plant superintendents acting as chairmen. Foremen are expected to invite a few of their men to each meeting. Committee meetings customarily feature the problems of some one department. For instance, there may be a pack-house meeting at which a large number of men from the pack house will be present and matters pertaining especially to that department discussed.

Charles P. Benner, safety inspector, Eastern mills, Lehigh Portland Cement Co.

In addition to general plant safety committees each department has a safety committee of its own, appointed by the foreman to serve for a term of six months. Each foreman holds informal meetings with this committee at intervals, thus helping to maintain interest in his department.

General plant safety meetings are held at intervals of several months. At such times two or three departments are shut down and the men brought together for 20 or 30 minutes. The superintendent, the safety supervisor or some other well-qualified person gives a short talk on safety to keep before the workmen what it means to them, to their families, to the community and to the company, to avoid accidents.

A number of plant bulletin boards are maintained on which bulletins are changed three times a week.

War on Carelessness

"Our ultimate aim during 1930 is to get safety across to every man in the plant, first by personal contact, second by showing them that accident prevention means everything in a man's life and third by getting their cooperation, which we believe we have already accomplished, as we have gone, to date, 330 days without a lost time accident," writes L. R. Rice, safety engineer of the Nazareth Cement Co. Emphasis at this plant is placed on employee training and education rather than on reliance on mechanical safeguards, as experience proves that the majority of accidents are caused by careless employees, horse play, and the lack of safety education.

"We have a general gathering of 90 per cent of the employees in a safety mass meeting the first week of every month at which we show safety pictures which apply to our plant," says Mr. Rice. "We have some of our foremen tell about safety conditions in their departments, and we encourage the workmen to give their safety ideas in these open meetings."

Immediately after an accident or a near accident an investigating committee composed of four foremen and the safety engineer, makes a complete investigation and reports to the superintendent. This committee also sees that all steps necessary to prevent a recurrence of the accident are taken. The investigating committee also reports at the monthly general meeting so that what has been done will be brought to the attention of all employees.

Safety suggestions are solicited from employees and monthly awards of $10 and $5 are given for the best ones submitted. The Nazareth Co. has adopted physical examination of employees as an aid to accident prevention.

Safety work at the Missouri Portland Cement Co., as reported by D. B. Coleman, is carried on by

two separate committees, one of workmen and the other of foremen. These committees meet separately on alternate Wednesdays. By keeping foremen's and workmen's meetings separate, there has been a greater willingness on the part of the workmen to express their ideas than when their foremen were present. In addition to these meetings, each foreman gets the men in his own department together at convenient intervals and has a discussion of the safety problems peculiar to their own work.

"At eight o'clock each morning and evening a safety whistle is blown for 30 seconds for the purpose of calling the attention of all employees to their safety," reports L. J. Wheeler, superintendent of the Lone Star Cement Co. (Kansas) mill at Bonner Springs. "Everyone is requested to stop whatever work he is doing while the whistle blows. At this time he is to check up on himself and see if he is working safely, and resolve to finish his shift without causing an accident."

This plant, as well as other mills of the International system, makes use of a cash bonus which is given to each member of an accident-free department. Physical examination of all employees is also being undertaken this year.

General safety meetings are held once each month, each being in charge of a different department. All employees attend for one-half hour on company time. The programs are varied to make them both interesting and instructive. Speakers are secured from outside the organization as well as from within. Employees themselves often take part in these programs. Each department has a first-aid team which performs at the meeting handled by that department. Entertainment in the form of short playlets and musical numbers by employees also features safety meetings.

The plant safety committee consists of the foremen and one man from each department. This committee makes two complete inspections of the mill each month. Bulletin boards are used to convey safety suggestions to the employees.

"At the beginning of every shift, whether it is night or day, in the mill or in the shop, every foreman calls his crew together for five or ten minutes for safety discussion," according to H. E. Nichols, superintendent of the Southwestern Portland Cement Co., El Paso, Texas. At this plant special emphasis is given to first-aid training and, to date, 69 men have received certificates for completing the Bureau of Mines first-aid course.

Better Health Campaign

A. S. Bilderback, safety engineer of the Riverside Cement Co. reports the establishment of a better-health campaign at the Crestmore mill with the thought that men enjoying good health are more likely to be careful and less subject to accident. Foremen's meetings are held once a month at which safety and various phases of foremanship are discussed. The discussions of these meetings are typed and copies furnished to all foremen. Safety posters and literature are kept on display. An award known as the William G. Henshaw safety trophy is given to the department having the best accident record.

At each of the plants of the Wolverine Portland Cement Co. the entire mill force is divided into two factions, each of which is headed by a captain and is represented by a flag. The side having the best record is entitled to fly its flag above that of the other one. It is also understood that, at the end of the year, the losing side will have some penalty inflicted upon it at the annual safety banquet.

The entire force of both Wolverine mills has taken the first-aid training offered by the Bureau of Mines. Safety teams also have been developed at each plant. New employees are thoroughly instructed in first aid work.

R. H. MacFetridge, superintendent of the Lehigh mill at Birmingham, Ala., reports that safety work there is supervised by a plant-safety committee having the superintendent as chairman, and divided into four sub-committees as follows: inspection, fire, sanitary and publicity. The inspection committee inspects the plant at regular intervals for accident hazards and investigates each accident with recommendations as to how to avoid a recurrence under similar conditions.

The fire committee inspects the plant for fire hazards, tests and checks the fire equipment and trains certain employees to operate this apparatus efficiently. The sanitary committee is responsible for the "housekeeping" at the plant. It inspects the change houses, toilets and hospital. It

H. E. Nichols, superintendent, Southwestern Portland Cement Co., El Paso, Tex.

W. F. Murray, general superintendent, Wolverine Portland Cement Co., Coldwater, Mich.

also cooperates with the plant physician and assists him in examining employees at regular intervals.

The publicity committee is responsible for the maintenance of the bulletin boards, posting the various literature and displaying dangerous broken parts of machinery and other object lessons. It also cooperates with the local Safety Council in the prevention of accidents in streets, homes and schools.

Safety Paper Published

Employees of the Lone Star Cement Co., Pennsylvania, issue a valuable monthly safety paper. This is a feature common among the International system mills and one which seems to be quite beneficial. It has been found that a small plant paper may be used to present some messages with regard to safety more effectively than through the spoken word.

F. F. Parker, superintendent, Pacific Portland Cement Co., San Juan Bautista, Cal.

J. R. Dowrie, superintendent, Canada Cement Co., Fort Whyte, Manitoba, Canada.

This plant also has an active safety committee consisting of foremen of departments and a safety inspector who acts continuously, with five other men chosen to serve one month only. Cash bonuses are paid to members of groups which have no lost-time accidents.

E. N. Dodd, safety engineer at the Des Moines, Ia., plant of the Pennsylvania-Dixie Cement Corp., has sent the accompanying photograph of the departmental safety score board installed this year. If an accident occurs in any department an ambulance will replace that department's car and it will be pushed backward to a position which indicates the number of accidents per 1,000 man-days worked.

Twenty months without a lost-time accident and three months without even a minor accident requiring any sort of treatment is the record of the Victorville, Cal., mill of the Southwestern Portland Cement Co. "We installed guards in every conceivably dangerous place," says H. Sergeant, safety engineer, "but soon found that these alone did not stop accidents. Finally, we came to the conclusion that individual safety training was the most effective method of reducing accidents. We are now concentrating on the elimination of minor accidents feeling that if we are continually alert against small accidents the lost-time accidents will take care of themselves.

Safety bulletin board, Des Moines plant, Pennsylvania-Dixie Cement Corp.

"Safety training as part of a man's work is the deciding factor in this great undertaking and must be practised by all from the highest executive to the lowest workman."

This is the slogan of the Osborn, Ohio, plant of the Southwestern Portland Cement Co., according to W. T. Groner, superintendent. And the employees are working with that slogan in mind to win a safety trophy for 1930. Their safety program includes regular safety meetings, daily plant inspection by the safety director, and interplant no-accident contests aimed at minor as well as lost time accidents. Bulletin boards, a safety court and safety first and first aid instruction for foremen and workmen are other features of the program.

Safety work at the Pacific Portland Cement Co. mills is carried on extensively. F. F. Parker, superintendent of the plant at San Juan Bautista, Cal., reports compulsory participation of all employees in first-aid training to the extent that they are able to pass the examination given by the Bureau of Mines. For first-aid work, employees are divided into groups, public contests being put on quarterly at which time all employees are present.

Safety inspections form one of the major safety activities at the Redwood City plant, according to M. J. Johnsson, superintendent. A safety inspector makes a weekly inspection and in addition, a workmen's committee consisting of three members and a secretary makes an inspection once a month. The findings of these inspectors are discussed at the general safety meetings held monthly. Plans are under way for an impressive dedication ceremony at the time this plant receives its trophy won in the 1929 contest. It is thought that this will add fur-

J. E. Bonnell, superintendent, Lone Star Cement Co., Dallas, Tex.

ther impetus to safety work.

A series of cartoon bulletins designed to attract the attention of employees was used at the Osborn plant of the Wabash Portland Cement Co., says L. E. Palmer, works manager. These carried ideas which could readily be grasped by the workmen. This plant was one of the successful trophy contenders in 1929.

Safety Work in Canada

A new monthly safety bulletin for the employees of the Lakefield, Ontario, plant of the Canada Cement Co., Ltd., has been reported by Joseph R. Hill, safety engineer.

An enthusiastic safety committee is the backbone of the safety work at the Fort Whyte (Manitoba) plant of the Canada Cement Co., of which J. R. Dowrie is superintendent. This committee meets regularly once a month and oftener when there is some special item that needs immediate attention. Every accident, no matter how small, is investigated by this committee and a remedy designed to prevent a recurrence. Some new construction work is in process at the plant and this is being carried out with safety as the primary consideration regardless of time or cost.

A cash bonus of $1 per man for every month completed without a lost-time accident has been inaugurated at the Concrete, Wash., plant of Superior Portland Cement, Inc., according to H. A. Ambler, superintendent. Every month a short letter is sent to each employee describing the first accident in that month whether lost time or not, with suggestions on how to avoid similar mishaps in the future.

Several safety inspectors are appointed each month. These men have uncovered a lot of hazards overlooked by the regular safety committee and the Superior Corporation has found them of valuable assistance in promoting safety.

"We have made a resolution to go through 1930 without a single lost-time accident," writes A. K. Frolich, superintendent of the new plant of the Ash Grove Lime and Portland Cement Co., at Louisville, Neb. "For that purpose we have organized a permanent 1930 accident-prevention committee consisting of three of our foremen. The employees are divided into four teams, and a regular competition is run every month with a large score board showing the daily progress of each team. An important factor in the race is to get first-aid treatment for all minor scratches within 30 minutes. A team loses four points for each mishap but only one point if the injury is reported within 30 minutes, maximum progress per day being four points. Twelve clear electric lights are placed at the top of our bulletin-board with the months marked above them. The light bulb for each successful month is replaced with a green bulb.

"We are further preaching safety first to our employees in their own homes as we consider a man safe only when he has formed the habit of living up to safety rules 24 hours a day."

First-aid training is being given all employees of the Yosemite Portland Cement Corp. plant at Merced, Cal. Interest in this is stimulated by contests within the organization and with first-aid teams from other companies. The plant team is also expecting to enter the state contest to be held in May. "We find that safety first goes hand in hand with first-aid," says G. A. Fisher, general manager of the Yosemite Corporation. "In fact, we find that an employee who has been taught first-aid thinks of safety far more than one who has not.

David Adam, director of Safety, Lawrence Portland Cement Co.

"We constantly endeavor to attach to accident prevention the seriousness and importance which properly belongs to this phase of our work," says J. E. Bonnell, superintendent of the Lone Star Cement Co. Texas plant at Dallas.

A well functioning safety committee is responsible for the safety work at the Dallas plant. This Committee is composed of all the foremen and key men of the organization as permanent members and two special members selected for short terms from the different departments, so that over the year all departments have representation in committee meetings. The general safety meetings are held once each month with all employees who can be spared from operations, in attendance. Each meeting is conducted by one of the departments.

Officials of the company have taken an active interest in accident-prevention work. One expression of this interest is in the form of a cash award offered to each man in any department completing a calendar year without a lost-time accident. During 1929, these awards totaled about $2,250 at this plant.

Emphasis on Education

"Realizing that more accidents are caused from the human element than from lack of mechanical guarding, we are devoting more of our efforts to

the task of educating the men," writes W. M. Cabaniss, superintendent of the Lone Star Cement Co., Alabama's plant at Birmingham. "I don't mean by this that we pay no attention to mechanical guarding, but if the men are sold on the safety idea, the mechanical guarding and especially the keeping of the guards in place, will automatically follow."

Education is carried out by use of bulletin boards illustrating in picture form what has or may happen if proper precautions are not taken. Warning signs are placed at danger points. General safety meetings of all employees are held once a month.

To sustain interest in safety work the company has purchased a cup upon which the name of the department or departments having the best records for the year are engraved. As an added inducement the company pays a cash bonus to each man in any department which goes through the year without an accident.

Complete physical examinations and the employment of physically fit men only are advocated by J. C. Capper, superintendent of the Three Forks Portland Cement Co. plant at Hanover, Montana. Defective eyesight is given as a cause of frequent accidents.

At the Trident, Mont., plant of the Three Forks Co. interest in safety work has been stimulated by dividing the plant into four safety departments, namely: Quarry, Day-mill Shift, Night-mill Shift, and Office and Laboratory. Each of these four departments is organizing its own first-aid team. Two safety meets will be held during the year. Clarke F. Leh is superintendent of the Trident plant.

"Dragon News" is the name of a new monthly leaflet devoted to safety and employees' interests which is being issued for employees of the Lawrence Portland Cement Co. with mills at Siegfried, Pa., and Thomaston, Me. A set of safety rules has also been printed and furnished to each employee, according to David Adam, director of safety and welfare.

O. A. Wishman, safety engineer at the Thomaston plant, reports that safety work is in charge of a committee consisting of the foremen and department heads, which meets once a month. At this meeting accidents of the past month are discussed and suggestions made to avoid repetition. Members of the committee bring to the meeting items of importance and suggestions for improving safety conditions. Recommendations made are either accepted or discarded after discussion. Special emphasis is placed on some one safety topic at each meeting for the purpose of making it clear in the minds of those present that safety is as much a part of their work as production.

Physical examination of employees is required at this plant.

Good progress in safety work has been reported by W. L. Kaiser, superintendent of the Peerless Cement Corp. plant at Detroit. Mr. Kaiser writes: "We have had a general safety committee for some time which meets monthly, but recently organized a workmen's committee which meets weekly. This committee is made up of one representative from each department and it is our opinion that this workmen's committee is obtaining better results than any other method we could have used in reaching the employees.

"We also have a trophy offered by our company for the plant having the best record for the period September, 1929, to September, 1930. We are all fighting hard for the cup."

At the Petoskey Portland Cement Co. plant at Petoskey, Mich., emphasis this year is being placed on the determination of the responsibility for every accident no matter how trivial, according to E. C. Switzer, general superintendent. Strict disciplinary measures are taken with offending employees.

All safety work at the Petoskey plant is carried on through a committee composed entirely of foremen. These foremen are required to get their men together in the various departments at least every two weeks for the purpose of discussing safe working methods. Regular plant inspections are made by safety inspectors and their recommendations are turned over to the safety committee, who are responsible for removal of all hazards reported.

Awards Safety Flag

At the Port Huron plant of the Peerless Cement Corp., according to James R. Wellman, safety director, each department is given a green flag with a white star on it, a replica of the safety flag used in the June No-Accident campaign. This flag is placed in a conspicuous place so that everyone can see it. In case a lost-time accident occurs in a department, that department will lose its flag and be given a white one which it must display until the end of the month. This plan is creating considerable rivalry, as no department wants to fly the white flag.

Every man in this plant is to be given an opportunity to take the first-aid course given by the U. S. Bureau of Mines. Mr. Wellman believes that each man who takes the course will not only be fitted to render first aid in case of accident, but will also be better trained to work safely.

Clarke F. Leh, superintendent, Three Forks Portland Cement Co., Trident, Mont.

Safety meetings are held twice each month. Each of these meetings is in charge of a foreman appointed at the previous meeting. It is found

that this plan brings out more ideas from the men and they feel freer than if the superintendent or safety director were in charge. Each month a safety committee of three men is appointed to make an inspection of the plant.

Three bulletin boards are used to keep the idea of safety forever in the minds of the employees. Posters on these are changed two or three times a week.

Detailed information on the safety bonus plan in effect at the Limedale plant of the Lone Star Cement Co., Indiana (as well as other mills of the International system), has been furnished by John O'Callaghan, assistant superintendent. Each man in a department which goes one calendar year without a lost-time accident receives a $10 cash bonus. If the department goes two years without a lost time accident each man receives $20, three years $30, four years $40 and five years $50.

This year the plant expects to start physical examination of all employees, old as well as new. Safety work is in charge of a safety director and a committee consisting of one representative from each of nine departments. The safety director is a competent first-aid instructor and he has a class in first aid going continually. This company feels that keeping the plant and surroundings clean, orderly and well lighted is the first step in a well balanced safety program, as it shows the employees that the management has their interests at heart.

At this plant the safety director makes daily rounds through the mill interviewing the men, looking over machinery, hunting for unsafe practices and recommending whatever changes are necessary to insure safe conditions. The foremen and department heads are in constant touch with the safety director and recommended changes are promptly attended to. Posters and literature are used continually.

Safety work at the Northwestern States Portland Cement Co. plant at Mason City, Ia., is in charge of a safety committee consisting of all foremen. It meets at least once a month. At the meetings reports of all accidents are discussed and the monthly bulletin of significant accidents by the Association is also gone over carefully. Each week the mill is carefully inspected by a man appointed by the superintendent. In addition to this, a committee of five foremen makes a thorough inspection of the mill prior to the meeting of the safety committee.

No-Accident Derby board, Buffalo, N. Y., plant, Great Lakes Portland Cement Corp.

A committee of three foremen has been selected to review the first-aid work as taught by the Bureau of Mines and then state before the safety meeting the more important things that each man should know. It is planned to give first-aid instruction to more men throughout the mill.

At the Superior, Ohio, cement plant of the Wellston Iron Furnace Co., according to V. D. Diefenderfer, superintendent, two safety meetings are held each month. One of these is for the various foremen and one for all of the employees and their families. At the foremen's meeting problems concerning safety throughout the various departments of the plant are discussed. The general meetings not only take up some of these problems but also devote time to various phases of home hygiene and home life with the intention of keeping the employees in good health at all times.

Conducts No-Accident Derby

Two bulletin boards at the Buffalo plant of the Great Lakes Portland Cement Corp. help to keep interest in accident prevention alive, reports J. B. Zook, safety director. One of these is located along the route everyone passes to and from the time clock, material being posted daily to keep up interest in the board. The other bulletin board is used for posting the names of the men in the different safety groups into which the company is divided. There are seven groups in all and these seven groups compete in a monthly no-accident derby. The accompanying illustration shows the board used to record the standing in the no-accident derby. The results of this competition have been very gratifying and Mr. Zook believes that this derby was largely responsible for his plant winning an Association trophy during 1929. The winning group each month is paid a bonus and this also helps keep competition alive.

John Rae, superintendent of the Cuban Portland Cement Corp., Cayo Mason, Cuba, reports that his company has outlined a program by which it hopes to achieve a perfect safety record during 1930. A general safety committee has been formed consisting of twelve members, one from each department of the plant. This committee is divided into four sub-committees of three members each. Each of these sub-committees serves during one week of the month and its duties are to carry out two inspections, one at the beginning of the week and another at the end. The departments inspected are those to which the members belong. Each department is inspected by the foreman in charge and the other two members of the subcommittee. In this manner a very thorough inspection of each department is made every month and a general discussion of the reports submitted by the sub-committees is made at the meeting of the general safety committee.

A mass meeting is held once a month, each of the twelve departments taking charge of one of these meetings and arranging a program of speeches, safety plays or first-aid demonstrations. A first-aid team has been organized with a man from each shift of all departments on the team so that in case of an accident there will always be a trained member of the team at hand.

A monthly safety bulletin is published in Spanish for distribution among employees.

At the Ironton, Ohio, plant of the Alpha Portland Cement Co., which has been a trophy winner for the past three years, new departmental safety bulletin boards have recently been installed, in addition to the regular boards used for displaying safety posters.

When the plant safety committee finds an unsafe condition in a department, a report of it is made to the foreman and a copy placed on the department bulletin board. Then a flag bearing a skull and cross bones is also placed on the board showing that danger lurks in that department. The report and the flag remain until the condition is remedied and O.K.'d by the permanent plant committee chairman. If an unsanitary condition exists the same measures are taken, only a different flag is displayed. If the department is in a safe and clean condition a flag with a white cross on a green background is shown.

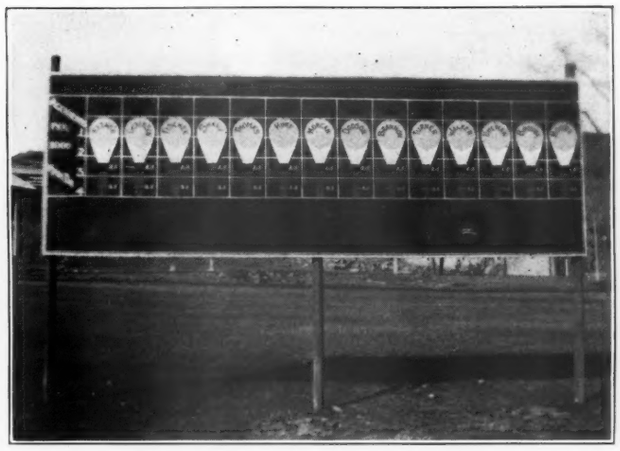
The plant safety committee consists of the foremen and department heads. Each of the foremen is chairman of the committee for one month and during that month is responsible for the safety work of the entire plant. At the monthly meeting he also assumes charge of the meeting and conducts the program. In addition, there is a permanent safety chairman who supervises the work of the entire plant.

At the Calveras Cement Co., San Andreas, Cal., safety programs are worked out by a committee consisting of the superintendent, foremen and department heads which meets once each month. Safety suggestions of employees are solicited and these are discussed at the meetings. If any accidents have occurred during the month the committee investigates them and takes steps to prevent a recurrence.

Sixty per cent of all employees took the U. S. Bureau of Mines first-aid course in 1929, and it is planned to give the course again this year. All bulletin boards are kept posted with new material to keep the interest fresh.

Hold Balloon Race

An accompanying illustration shows a novel bulletin board installed at the Pennsylvania-Dixie plant at Richard City, Tenn., for its 1930 balloon race. Each of the safety group has a balloon on the board bearing the name of its foreman and department. The board upon which these balloons is mounted is graduated to show accidents per 1,000 man-days worked. By basing the rating of any particular group on the number of man-days worked, all crews are put on equal basis regardless of size. At the beginning of each three-months period all balloons are placed at the top of the board and remain there until some employee has a lost time accident. The balloon for the department in which this man worked will then be lowered to its proper position.



Balloon race score-board at Richard City, Tenn., plant, Pennsylvania-Dixie Cement Corp.

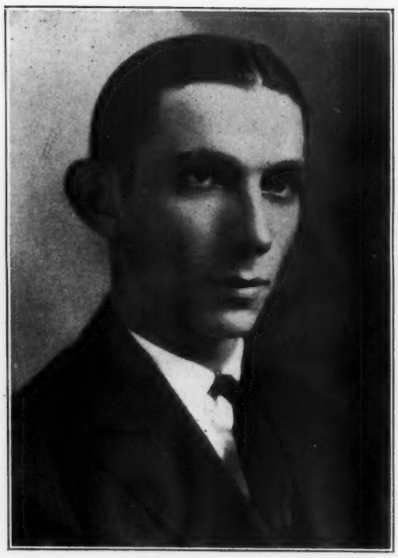
"We are working on the principle that by following a thorough educational program, by promoting better working conditions and by securing loyalty and harmony among employees, we will one day join the ranks of mills which have gone through a year or more without an accident," says A. E. Hiscox, superintendent of the West Penn Cement Co. mill at Butler, Pa. "During 1930 we will concentrate on education of our employees in all phases of safety and accident prevention."

The plant personnel at the West Penn mill has been divided into eight groups made up of different departments and so assigned as to equalize the job risks. Representatives to the regional safety meeting at Cleveland in June will be chosen from the three divisions having the highest rating at the end of May. During June (No-Accident month) a second contest will be conducted with these groups and for the last half of the year, a third contest.

A foremen's club has been organized which functions as a safety committee and is assisted by the safety director. Weekly safety meetings are held and are attended by all foremen and in addition, two men from each division. A monthly plant magazine devoted primarily to safety and welfare is being issued. Plans are under way for monthly safety banquets at which the best available speakers will be secured.

An interesting account of safety work comes from Duncan Gloag, secretary of the safety committee at the Bamberton works of the British Columbia Cement Co., Ltd. The plant has a safety committee of 15 members selected from the various departments. This body functions as a central committee, meeting once a month, and in addition special meetings are held to deal with any emergency. Monthly inspections of the plant are carried out by a member of the committee in conjunction with a senior employee who is not a member;

different employees are detailed for these inspections each time. For the purpose of competitive and easily administered safety organization, the plant has been divided into five safety units consisting of: No. 1, the quarry; No. 2, mill-kiln mixers and boilers; No. 3, shop, sub-station and outside repair gangs; No. 4, loading, cleaning, coal plant and yard gangs; No. 5, offices, carpenters, teamsters, cord-wood cutters, cooks and miscellaneous. In addition, there is a base unit for new employees who are placed in this group until considered sufficiently conversant with safety measures to be placed in the unit with which they are employed. Special emphasis is placed in this plant on training of new employees in safety work.



C. E. Caron, superintendent, Florida Portland Cement Co., Tampa, Fla.

H. R. Shipley, superintendent, Oregon Portland Cement Co., Oswego, Ore.

Safety units which complete a period of six months free from accident are given a special button for each member. These may be worn until the unit meets with a lost-time accident, when the buttons are called in and not re-issued until a further six months free-from-accident period has passed. Members of units which have a three-year safety record are presented with gold buttons engraved with the words, "Three Years Safety." These become the employee's personal property.

Strict enforcement of safety rules is being featured at the Howe's Cave, N. Y., plant of the North American Cement Corp. in the hope of making good on the slogan of "No lost-time accidents in 1930." These rules pertain to the wearing of goggles, discouragement of horse play, warnings against loose clothing, etc. Suggestion boxes are placed in different locations around the plant and a number of valuable ideas have been received from employees. Each month an employee is elected to the safety merit club by ballot of the employees. An endeavor is made to select some employee who is not sufficiently sold on safety. After a few meetings the general rule is that this man is thoroughly converted to safe practices.

The Oregon Portland Cement Co. plans to send a number of men to the Seattle regional safety meeting to be held in September, according to H. R. Shipley, superintendent. The men at the plant have been divided into three teams. A contest will be run by giving the teams points for safety ideas and suggestions. The team with the highest number of points will be entitled to select 50 per cent of these representatives; the second team, 30 per cent; and the third team, 20 per cent.

Safety activities at this plant are directed by a committee consisting of men from every department, who meet and make a complete plant inspection every month. A general safety mass meeting is held once each month. Safety signs and a weekly paper edited by the safety engineer are used to keep the idea of safe working continually before the workmen. Entertainments for the men and their families are also being planned.

Responsibility on Foremen

As a basis for safety work at the Pittsburgh plant of the Universal Atlas Cement Co. the safety committee has stated that "the foreman is responsible for all accidents." Assistant Superintendent J. R. Cline is in active charge of all safety work. A weekly meeting is held with the heads of departments and leading foremen at which the record of the past period is gone into in detail. This group makes up the general plant safety committee. Each foreman holds group safety meetings with his men so that every man attends at least one safety meeting a month. There is also a special group of safety officers consisting of one member for each 20 employees, appointed for a year. The safety officers meet one-third of the employees each week so that all are represented in one meeting each three weeks.

Each spring and fall a special committee of five trained foremen is appointed to inspect the plant, paying particular attention to structures, machines, wiring, etc. This inspection takes about a week. In addition to the above group another group of five leading men from as many departments inspects the plant each month.

For over two years the Bellevue, Mich., plant of the Alpha Portland Cement Co. has operated without a lost-time accident, winning in both the 1928 and 1929 Association trophy contests. And, according to G. A. Lawniczak, plant superintendent, his organization is more determined than ever to be among the winners in 1930. Mr. Lawniczak says, "The things that the Bellevue safety commit-

tee will keep in mind most during 1930 are: (1) To keep the plant a fit place for a man to work; (2) to train every employee in the necessity of good housekeeping, which is a big factor in safety; (3) to see that all minor accidents receive first aid; (4) to instruct each new employee regarding plant hazards; (5) to make strict rules to govern screw conveyor covers and see that all screw conveyors are properly protected at all times. Any man found working on a screw conveyor with cover off will be removed from the payroll as an unsafe worker. (6) All foremen will be required to give short talks on safety to the men in their departments at least once every two weeks. (7) The safety committee will see that all bulletin boards are kept well posted. (8) All near-accidents must be reported to the safety committee. (9) Safety committee shall see that proper plant inspection is carried out and plant safety meetings will be held twice monthly, at which time all committees will make reports on plant conditions."

At the Florida Portland Cement Co. plant a safety meeting is held every two weeks at which all foremen and department heads are present. A different man serves as chairman of each meeting. Responsibility for safety is placed upon the foremen. They conduct their own departmental meetings, plan their own campaigns and review the Bureau of Mines first-aid manual with the men under them.

Each man must report for first aid for even the slightest injury. A record of treatment administered is kept in the first-aid department, in duplicate. One card is filed against the name of the injured man and one against the foreman. In this manner it is easy to see at once how many accidents a man has had and how many accidents there have been under each foreman. Employees are encouraged to report all unsafe places or practices and blanks are provided for that purpose.

W. M. Powell, safety director, Medusa Portland Cement Co.

All of the men in the mill are trained in the U. S. Bureau of Mines first-aid work and every two weeks a written examination is conducted on ten questions picked from the first-aid manual. Every man is required to take this examination. National Safety Council posters are kept on the bulletin boards. In addition, "The Safe Worker" is issued each month to the employees and a safety insert is enclosed with each semi-monthly pay check.

United Safety Effort

An interesting account of safety activities at the Medusa Portland Cement Co. comes from W. M. Powell, safety director for all of the Medusa plants. The following excerpts are quoted from this report:

"For the year 1930 we hope to standardize the manner in which the prospective employee is interviewed and introduced to his job at all our plants.

"We are adopting a set of general rules applying to safety which will be posted in the plants.

"Our plant committee is composed of the foremen, but from time to time operators and mechanics are invited to sit in at the regular meetings. In two plants the committee members rotate as chairman, each serving for one month.

"We know that general mass meetings of employees and their families create the right spirit. We have held meetings of this kind and expect to have more of them during the coming year.

"We have a safety flag which we keep flying until an accident occurs, then the foreman of the injured has to lower it until the end of the month, when it is again raised.

"A scoreboard showing the score of all departments day by day is posted in a conspicuous place and is kept up to date.

"An attractive metal enameled sign is placed in each department on which is marked each day the number of days which that department has operated without a lost-time accident."

At the Fort Worth, Tex., plant of the Trinity Portland Cement Co. safety meetings are held at ten o'clock each Monday morning. At five minutes to ten the plant whistle blows to indicate that the men who have been notified by their foremen to attend the safety meeting are to appear. Over a period of one month every man attends at least one meeting. Meetings are conducted by a safety committee consisting of ten men which includes the foreman of each department. Minutes of the meeting are posted on the bulletin board so that all may read them. Some of the best suggestions on safety practices have come from men on the job who have placed them in a little box labeled "Safety Suggestions" which is placed beside the time clock.

From time to time banquets at the plant are held for employees and their families so that home influences will tie-in with safety efforts at the plant.

The safety organization of the North American Cement Corp. at Catskill, N. Y., consists of one chairman, one secretary, one safety inspector, all department heads, twelve safety-merit-club members, one first-aid instructor and six first-aid team members. The department heads with the secretary and chairman make up the general safety committee, which meets once each month.

(Concluded in next issue)

Concrete of Any Specified Proportions Produced by Rochester, N. Y., Plant

Water-Ratio Control and Fineness-Modulus Method of Grading Aggregates Are Employed

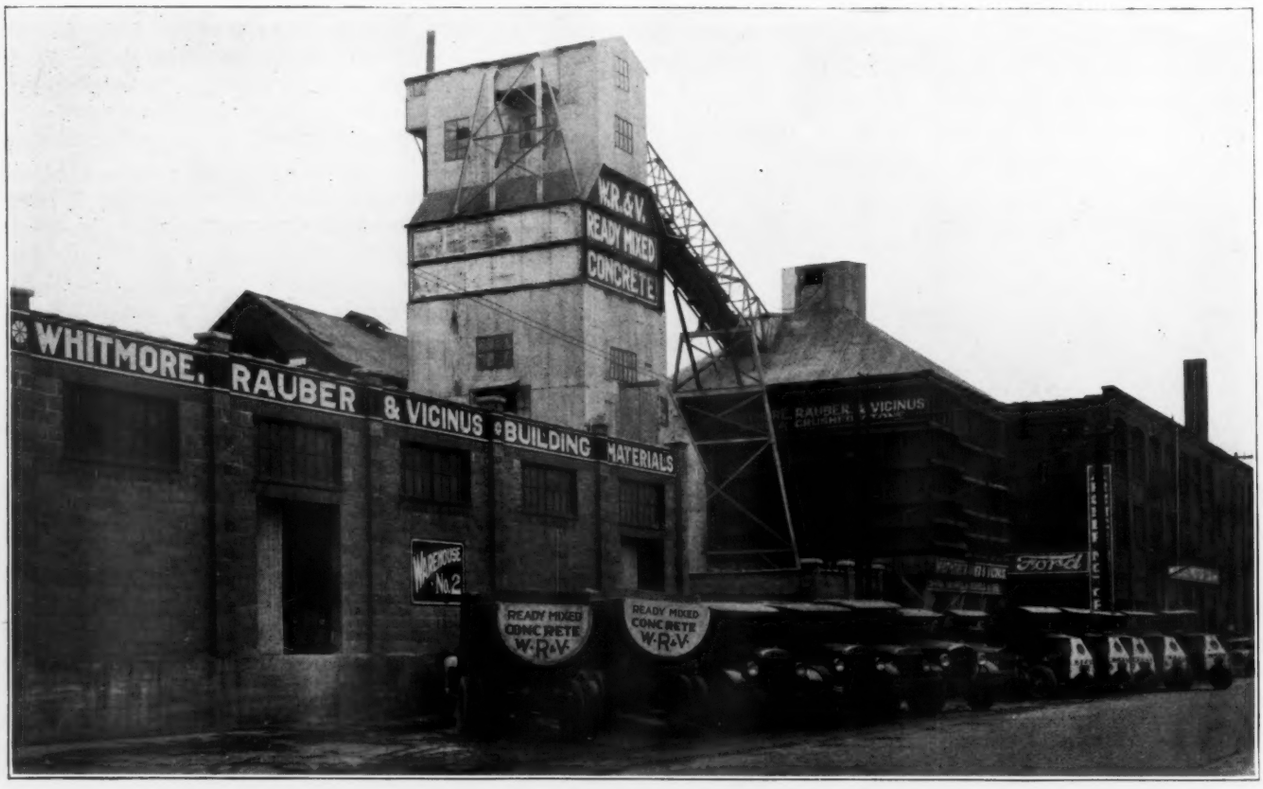
THE firm of Whitmore, Rauber & Vicinus, of Rochester, N. Y., general contractors and building supply dealers, a few years ago found themselves ideally situated for the production of ready-mixed concrete. The firm is one of the oldest of its kind in the city and had been handling sand and gravel for some years. A modern aggregate handling plant already in place made the installation of a central-mixing plant a comparatively simple and inexpensive procedure.

The property on which the operations of the company are located is on Mount Hope Ave., near the geographical center of the city and less than one-half mile from the main business section. Deliveries to any part of the city can be made in less than 25 minutes.

The aggregate plant is of a modern type with concrete foundations and driveways, and has a capacity of 25 cars per day. The nine timber bins have a total capacity of 1,250 tons. Six of these bins are equipped with Butler volume batchers. The sand and gravel used is received over the Lehigh Valley Railway in bottom-dump cars onto a siding alongside the plant. The cars discharge into a track hopper from which a belt feeder discharges to a series of two inclined belt conveyors. The last conveyor discharges through a swivel chute to any of the nine bins, or to another 24-in. inclined belt conveyor on 70-ft. centers direct to the mixing plant. The belt feeder is driven by a 5-hp. motor through an IXL speed reducer and each of the three conveyors is driven by a 10-hp. motor. Material can be run also from the bins to the mixing plant.

The mixing plant, which was designed by H. W. Butler, has concrete foundations and driveways with structural-steel framework and corrugated-metal siding. The conveyor previously described discharges through a swivel chute to any of four out of six compartments of equal capacity in a 215-cu. yd. Butler steel bin at the top of the plant. These are used for sand and Nos. 1, 2 and 3 gravel.

Cement is purchased in bulk and unloaded from box cars by hand scraper. This discharges into a hopper feeding an enclosed chain-bucket elevator on 60-ft. centers. A hood fitted around the hopper and the car door eliminates waste. The elevator discharges the cement into the other two of



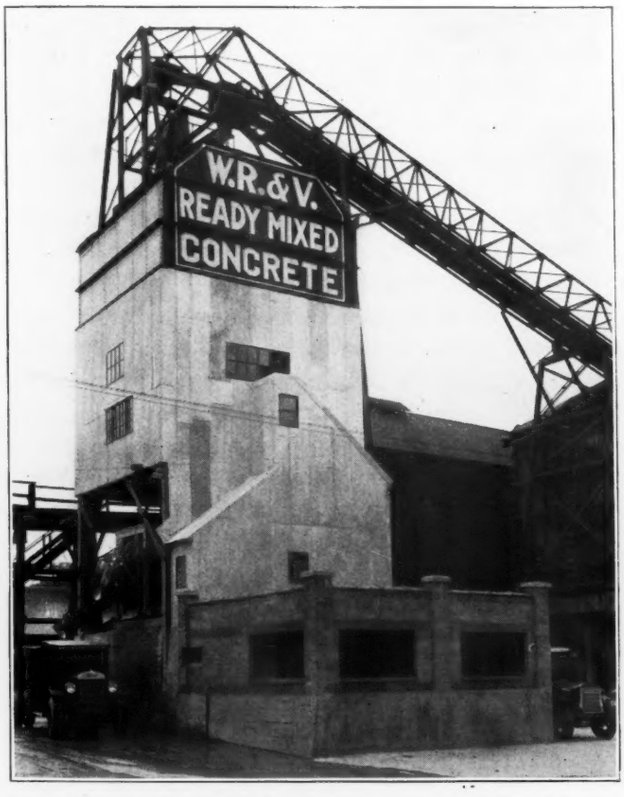
General view of plant, mixing building (center), aggregate building (right center).

the six bins on top of the mixing plant. These have a capacity of 250 bbl. each. This elevator is driven by a 7½-hp. motor through an IXL speed reducer.

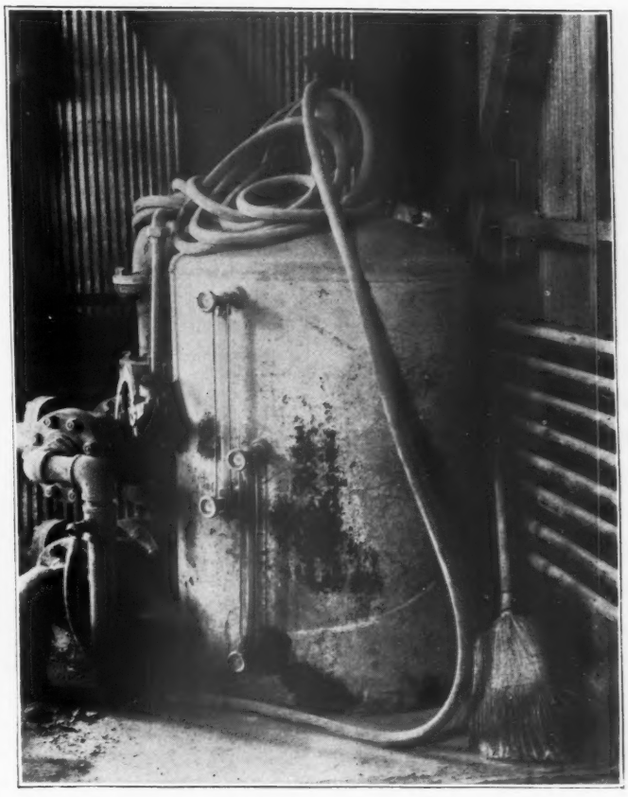
Sand and gravel discharge from these bins through Butler quadrant gates into the larger compartment of a two-compartment weighing hopper. Cement discharges through sliding gates into the smaller compartment. Compressed air admitted through valves in the sides of the cement bins prevent caking of the cement. The Butler weighing hopper is equipped with a Winslow three-beam scale having a dial registering the last 400 lb. to speed up weighing.

The weighing hopper discharges to another hopper from which the batch can be discharged into the mixer as soon as it is empty. In this way, three batches are always in process at one time and there is no unnecessary delay in the production of concrete. Water is measured in a Lakewood 75-gal. steel tank with a syphon arrangement which gives accurate control. The tank is filled and then, by moving one lever, the intake valve is closed and the exhaust valve opened. A water-glass is used to check the syphon measuring device.

The Lakewood No. 56 mixer has a capacity of 2½ cu. yd. of concrete and turns out an average of 350 cu. yd. in a 9-hour day, although 400 cu. yd. have been produced during the rush season. The fact that no concrete is mixed less than 2½ minutes shows that little time is wasted anywhere. The mixer is driven by a 40-hp. Fairbanks-Morse motor through countershaft reduction gearing. The plant was designed so that another mixer can be installed alongside this one—doubling the output at a very low cost.



Mixer building with truck ready to receive batch of concrete.



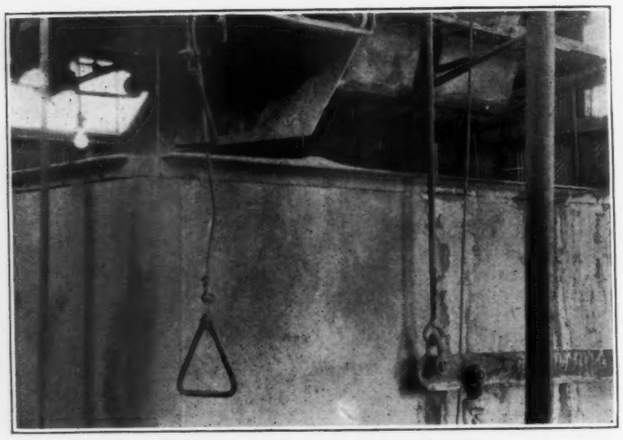
Water-measuring tank, 75-gal. capacity, with siphon control.

One man controls the entire mixing plant from the batcher floor, except when there is a demand for concrete using special cement. Then a helper is necessary, as this cement arrives in sacks. These are elevated to the batcher floor by a slat-chain elevator. The helper also assists the truck drivers in washing the truck bodies, after each trip, at a wash-rack alongside the loading platform. The mixer and cement elevators are controlled by the mixer operator, while the conveyors are controlled from the bottom of the first conveyor.

Allen-Bradley starting switches, Bulldog safety switches and Crouse-Hinds electric conduit are used throughout the plant. Conveyors and elevators were furnished by the Jeffrey Manufacturing Co. A small compressor furnishes air for the cement bins. A 75-hp. boiler on the ground floor furnishes steam to heat the material in both the aggregate plant and the mixing plant. An office on the first floor of the mixer building houses a Buffalo 20-ton capacity truck scale equipped with a Weightograph which affords instantaneous reading.

The concrete is delivered by nine trucks equipped with Wood Hydraulic Hoist & Body Co. 2½-cu. yd. bathtub-type bodies. Stewart, Autocar, Brockway and Mack 3½-ton pneumatic-tired trucks are used. Concrete has been delivered in these as far as 14 miles without bad segregation. During slack seasons for the concrete plant, these trucks are used also to deliver aggregates.

All mixes used in the plant are carefully designed



Gates from aggregates bins to weigh hopper.

according to the fineness modulus and water-cement ratio methods. Concrete of any strength requirement can be delivered, and tests show that actual strengths are considerably above those specified. A 4-in. slump is generally used as a maximum with a 6-in. slump for heavily-reinforced concrete work. The regard in which the product is held is evidenced by the fact that it is used not only for general construction work but for public buildings, paving, and construction work for the Erie and New York Central railroads as well.

Another gravel plant of equal capacity (25 cars) is now under construction alongside the present one. This will have five unit-type steel bins of equal capacity equipped with weighing batchers. It will be fed from a separate track and pit by a 24-in. inclined belt conveyor on 250-ft. centers. It is planned to handle some crushed stone at this plant.

In addition to the ready-mixed concrete plant, the company has an asphalt-mixing plant, a cement and concrete products plant, and a dimension-stone sawmill and polishing plant which is one of the largest in this section of the country. Cement, lime and all other kinds of building material are handled. In addition to general contracting, the company does considerable subdivision development work which uses a proportion of the concrete produced. The popularity of this concrete is evidenced by the fact that, although not a single salesman is employed to sell the products, the demand has always exceeded the plant capacity.

The main office of the company is at 51 Griffith St., Rochester, N. Y. Directors are: J. N. Rauber, L. S. Whitmore, W. W. Vicinus, W. V. Whitmore and J. E. Rauber.

French Producers of Kaolin Organize National Syndicate

The French producers of kaolin, at a recent meeting, formed a national syndicate. The object of the new syndicate is to bring about a closer relationship between the producers of kaolin; to study the needs of the industry; to negotiate with the railroad companies and other public organizations for the benefit of the syndicate. The headquarters of the new organization, which is to be known as the *Syndicat National des Producteurs de Kaolin de France,* will be at 7 rue de Madrid, Paris.

Texas Potash Corporation to Open Mine and Build Refinery

The development of potash resources in the Midland area is expected to be undertaken soon by the Texas Potash Corporation, Dallas, Tex., which owns leases, including oil and gas rights, on about 50 square miles of land in Midland, Ector and Upton Counties, Texas. The determination of the company to develop its resources is the result, it is said, of the discovery by the Bureau of Industrial Chemistry of the University of Texas, of a method of refining polyhalite, the principal potash mineral found in deposits of this state.

The company has expended about $200,000 in locating and definitely proving deposits on the properties and in chemical investigations, and it is understood it will proceed this spring with the sinking of a shaft in southern Midland County, expending approximately $2,500,000 for the shaft and the construction of a refinery in Midland County. Two exploratory wells have been drilled by the Longyear Exploration Co., Minneapolis, Minn., under the supervision of Dr. E. P. Schoch, acting for the Bureau of Industrial Chemistry, and Dr. E. H. Sellards, acting for the Bureau of Economic Geology, both of the University of Texas. In a report of Dr. Sellards to M. Agress, manager of the Texas Potash Corporation, the two wells demonstrate the presence of two potash minerals —carnallite and polyhalite.

A development program contemplates a fully-equipped mine unit with a 2,100-ft. shaft to the potash deposits, a refining unit designed especially to produce high-grade potash at a minimum cost, and water and fuel lines. The mine will be located about 10 miles from the main line of the Texas and Pacific Railway in Midland County, about 26 miles from Midland and 14 miles from Odessa. The method of mining will follow closely the modern method of mining rock salt, a program having been outlined, it is said, by the Allis-Chalmers Manufacturing Co., Milwaukee, Wis., and the Longyear Exploration Co. Officers of the Texas Potash Corporation include Homer R. Mitchell, president; M. Agress, vice-president; Wirt Davis, treasurer, and Tom G. Leachman, secretary, all of Dallas.

New York Crushed-Stone Producers Hold Monthly Meeting at Utica

Visit to Sterling Creek Plant of Eastern Rock Products Co. a Feature of Gathering

THE regular monthly meeting and luncheon of the New York State Crushed Stone Association was held Friday, April 25, at the Hotel Utica, Utica, N. Y. In the absence of President J. H. Odenbach the meeting was called to order by Vice-president H. J. Russell.

A. G. Seitz, of the General Crushed Stone Co., chairman of the committee to investigate the new lien law of New York State, reported the bill passed by both houses of the legislature and in the hands of the governor. He announced that the bill had been amended to exclude the objectionable features discussed at the last meeting of the association. Further discussion of the bill was postponed until the action of Governor Roosevelt, in signing or vetoing it, is known.

A proposal from the New York State Highway Chapter of the Associated General Contractors of America, Inc., was also discussed. In it was outlined a set-up for a Material-Men's Credit Inter-Change Bureau. This proposes an organization of sand, gravel and crushed-stone producers, contractors and dealers in construction materials, and outlines policies of extending credits.

However, it was decided that the proposed plan does not meet the requirements of the members of the crushed stone association, and the organization agreed to reject it.

The members were agreed, however, that the need for a credit inter-change exists. The committee on credit composed of A. G. Seitz and H. V. Owens was asked to continue its investigation of other methods for establishing such an organization or for utilizing a bureau already established.

Credit terms and cash discounts came up for discussion, members expressing themselves in favor of a general plan to be adhered to by all producers. A committee composed of Messrs. Seitz, Kaiser, and Francis Owens was appointed to investigate and present a plan for consideration at the next meeting.

A committee on stone and gravel specifications was appointed. Geo. C. Schaeffer and J. L. Heimlich are members of this committee.

The meeting adjourned for luncheon at which informal discussion of the points covered was continued.

Following the luncheon a brief business session was held. It was agreed to leave the date and place of the next meeting to the discretion of the executive committee of which J. H. Odenbach, president and A. S. Owens, secretary, are members. Buffalo and Syracuse were both mentioned as possible meeting places but neither was decided upon.

Following the afternoon meeting, the members of the Association were invited by Secretary Owens to visit the Sterling Creek plant of the Eastern Rock Products Co. of which he is vice-president.

The layout and equipment of the plant were extremely interesting to those of the association who were able to visit it. A national highway crosses the property, separating the beds and crushing plant from the storage bins and piles. A completely-enclosed belt conveyor has been built across the highway to connect the two.

Nature has provided a constantly replenished supply of sand and gravel at the deposit. Located at the base of the foothills of the Adirondacks, the company's gravel beds receive an annual deposit as the thaws each spring bring down tons of stone, sand and gravel from the hills. In fact boulders of such size are carried down in this way that a crushing plant as large and complete as in most quarries has been found necessary to handle them.

The plant is situated on the New York Central R. R. and on the state barge canal. The latter has

A. G. Seitz, General Crushed Stone Co., Syracuse, N. Y.

not yet been utilized though plans for the construction of docking facilities are now complete. This feature, together with the washing, loading and storage methods, interested the visitors.

The following members of the association were present at the meeting:

H. J. Russell, F. W. Wait Lime Co., Glens Falls, vice-president;
A. S. Owens, Eastern Rock Products Co., Utica, secretary;
Wm. McGrew, L. & M. Stone Co., Utica;
A. G. Seitz, General Crushed Stone Co., Syracuse;
F. C. Owens, General Crushed Stone Co., Syracuse;
Geo. E. Schaeffer, General Crushed Stone Co., Syracuse;
G. J. Murphy, General Crushed Stone Co., Syracuse;
W. L. Sporberg, General Crushed Stone Co., Syracuse;
H. V. Owens, Eastern Rock Products Co.;
R. M. Kelley, Eastern Rock Products Co.;
Arthur Sickles, Dolomite Products Co., Inc.;
J. L. Heimlichs, Le Roy Crushed Stone Co., Le Roy, N. Y.;
E. B. Johnson, formerly president Adams Dufort Co.;
Mr. Kaiser, Solvay Process Co., Syracuse, N. Y.;
E. C. Harsh, *Rock Products*, associate member.

Telegrams were received from John Rice, president, and Otho M. Graves, vice-president and general manager, of the General Crushed Stone Co., and from James Savage, secretary and general manager, and A. J. Hooker of the Buffalo Crushed Stone Co., who expressed their regrets at being unable to attend the meeting.

The comparatively small attendance was attributed to the seasonal rush of business and the fact that several members are installing new equipment and putting their plants in operation.

Is the Color of Oil an Indication of Its Lubricating Value?

By W. F. SCHAPHORST

A writer in a prominent trade journal recently stated that color should not be made the criterion in oil specifications. He pointed out that the color of oil is practically meaningless.

I agree with him. But he should have gone further while writing on the subject of oil specifications and their fallacy. I have never yet seen a set of oil specifications that would satisfactorily hold water. The essential properties of a lubricant defy perfect description in the same way that so many common things with which we come in contact cannot be defined. We might as well try to specify a perfect lady; it can't be done. As recently stated by Thomas A. Edison, we don't know one hundredth of one per cent of anything.

Specifications do not specify lubricity. Lubricity is the essential property of any lubricant.

Years ago I attended a lecture in which a college professor told us that the best way in which to specify an oil was first to find the oil that was satisfactory in every way and then analyze that oil. He stated that any oil which would show the same analysis, that would have the same viscosity, flash, gravity, cold test, etc., should be as satisfactory a lubricant as the original.

I have learned since, however, that the professor was considerably "off." No reliable test for lubricity has ever been discovered other than the actual use of the oil on the bearing it is to lubricate. It is a well-known fact that high-grade oils have a greater lubricating value than others. This is proved by the fact that bearing temperatures, when high-grade oils are in use, will not run as high as they do with low-grade oils. Yet the specifications of the two grades of oil may be identical in every way. Although the consumer orders oil, what he really wants is lubricity; and none of the specifications include this property.

In support of the above statements I quote the U. S. Bureau of Mines, which states in Bulletin No. 156, "Oil analysis alone is not sufficient to govern the selection of a desirable oil. The best way of testing the suitability of an oil is to note its performance."

Imitators are so clever these days that it behooves us to be exceedingly careful. The best oil specification, I claim, is to deal with reliable concerns. Pigeonhole your color, gravity, viscosity, and other specifications. Find the "brand" that does the work and then stick to it. That's the best oil specification I can write.

Figures Show Some Cement Employees Are Habitually Unsafe

Th. Avnsoe, vice-president of International Cement Corp., described an interesting proof of the value of fitting men to their jobs, and of investigating their safety records when considering their applications for employment. He writes to the National Safety Council: ".....it may be interesting for you to know that a survey is being made of all our domestic plants, and that the result from one has come in.

" 'During the last two years we had 132 reportable accidents; of these, three were fatal; 10 were lost-time accidents, and 119 were no-lost-time accidents. Of the total, we find that 12 men had 2 accidents each, a total of 24, or 18 per cent of the total accidents of the force; 4 men had 3 accidents each or 9 per cent of the total; while 4 men had 4 accidents each, or 12 per cent of all the accidents. This means that 5 per cent of the men were responsible for 40 per cent of the accidents.' "

Those figures most certainly bear upon the statement that there is no place in a cement plant for a man who is habitually unsafe, and also show that safety can be made an active qualification by requirement of the management. It is rather paradoxical that sometimes rules must be enforced against a man for his own safety, but such is the case. It also shows that, in dealing with future requests for employment, a capable, discerning employment agent can help in reducing the possibility of future personal injuries. We believe, through judicious questioning, it is possible to detect many of these "repeaters."

MEN OF THE INDUSTRY

The portrait printed on this page in each number of PIT AND QUARRY is selected without significance as to current events or the position of the individual in the industry.

REED C. BYE

Vice President,
The Warner Company
Philadelphia, Pa.

Personal Mention

Raymond Harris, of Murphy, N. C., who formerly operated the Regal Quarry at Murphy is soon to develop marble deposits near Marble, N. C. Overburden is now being removed and a plant is to be erected shortly.

Nelson S. Schmidt, former superintendent of the two Newcastle, Pa., plants of the Lehigh Portland Cement Co., has joined the Davison Coke & Iron Co., in the capacity of superintendent of that firm's cement plant located at Neville Island, Pa., near Pittsburgh.

Porter W. Yett, general manager of Swigert, Hart & Yett, ready-mixed concrete manufacturers of Portland, Ore., was elected president of the Transit Mix Concrete Manufacturers' Association at its recent meeting in Chicago, Ill.

M. E. Crosby, prominent cement-plant and grain-elevator engineer, has been named chief engineer of the MacDonald Engineering Co., Chicago. The company recently moved its offices to the forty-seventh floor of the new One LaSalle Street building.

R. A. Kyle, formerly of the manufacturing division of the Lincoln Electric Co., Cleveland, O., has been transferred to the welder service division, at New York. Other transfers were **John C. Ardaugh** to Chicago, Ill., and **Robert Newton** to Cleveland, O.

E. W. Dienhart has been appointed sales engineer of the H. H. Potts Co., Chicago, Ill., with headquarters at Chicago. Mr. Dienhart will specialize in sales promotion, engineering, technical and service work relating to Pottsco light-weight aggregate. Mr. Dienhart was formerly with the Cement Products bureau of the Portland Cement Association, and more recently with Consolidated Cement Corp.

Max W. Babb, vice-president of the Allis-Chalmers Manufacturing Co., Milwaukee, has been appointed a director of the Federal Reserve Bank of the Seventh District at Chicago, to fill the unexpired term of Augustus H. Vogel, Milwaukee, who died recently.

Walter Harnischfeger, vice-president of the Harnischfeger Corporation, Milwaukee, has returned from a business tour of continental Europe lasting three months.

L. W. Hayden has been appointed resident engineer, with offices in Philadelphia, by the Hevi Duty Electric Co., Milwaukee. His territory will include eastern Pennsylvania, Maryland, Virginia, Delaware, District of Columbia and the southern part of New Jersey.

George C. Packard, Jr., has been employed to represent Dewey Portland Cement Co. in the state of Arkansas. **Harry Mason** has been promoted to special representative of the Dewey company with headquarters in Little Rock.

J. B. Russell of Cameron, Mo., has bought the building material yard of **J. R. Moorehead** at Lexington, Mo., and it will be operated by his son, **J. P. Russell**, who has been engaged in the lumber business with his father at Cameron for many years.

H. W. Hardinge, head of the Hardinge Co., York, Pa., has returned after a six months' trip around the world.

William E. Magner, president of the Cutler-Magner Co., lime manufacturers of Duluth, Minn., has been elected president of the Duluth Builders' Supply Co. **Ralph B. Magner**, vice-president of the latter concern, was recently made president of the Cement, Sand & Gravel Co., of Duluth.

Charles Brossman, consulting engineer, of Indianapolis, has been appointed a member of the Indiana Building Council by Governor Harry A. Leslie. Mr. Brossman is president of the Indiana Engineering Society.

Harold P. Chapman, of Columbus, O., has been appointed chief construction engineer of the Ohio Highway Department, succeeding **Robert S. Beightler**, who will enter the contracting business in Wooster, Ohio, with **Adolph Stellhorn**, a former engineer in the department.

Obituary

C. M. Scott, Charlotte, N. C., representative of the Good Roads Machinery Co., died recently. Mr. Scott was well and favorably known throughout North Carolina, and a man of integrity and ability. He was thoroughly conversant with the subject of rock reduction work, and at one time designed and invented a special type of crusher.

James Crosby Brown, 57, of Philadelphia, Pa., died recently. Mr. Brown was prominent in Philadelphia financial circles and was a director of the Whitehall Cement Manufacturing Co., of Philadelphia and treasurer and a director of the Pennsylvania Glass Sand Co., of Lewistown, Pa.

Charles R. Klein, 73, died at his home in Mason City, Iowa, April 20, 1930. He was associated with the pioneers in the manufacture of Portland

Charles R. Klein.

cement in this country at Coplay, Pa., and followed the work in connection with cement manufacture throughout his active life. In 1900, while in the employ of the Atlas Portland Cement Co., he was sent to England to supervise the first operation of rotary cement kilns in that country and while in Europe visited also cement plants in Denmark and Germany to observe manufacturing methods. During the past 23 years, until advanced age and failing health compelled him to retire from active work about a year ago, he was employed by the Lehigh Portland Cement Co. at Port Ann, Ontario, Can., and at Mason City, Iowa.

Christian Scholtka, one of the founders of the Nordberg Manufacturing Co., Milwaukee, and general superintendent of its plants until his retirement in 1925, died April 16, at Milwaukee Hospital, after an illness of six months. He was 75 years of age and a native of Germany, coming to the United States as an infant. He learned the machinest's trade and was connected with a number of large local manufacturing industries before joining with other young engineers and shop executives in forming the Nordberg Manufacturing Co. Mr. Scholtka became one of the best known production executives in the Middle West and also achieved high rank as a designer and builder of Corliss engines and other prime movers.

Recent Patents

AMERICAN

Cement

Hydraulic cement and other calcareous plastics. William A. Collings, Los Angeles, Calif., assignor to Silica Products Co., same place. No. 1,755,502.

Concrete Distributing

Concrete mixer and distributor. Lyndon J. Van Kirk, Milwaukee, Wis. No. 1,754,533.

Concrete elevating and distributing apparatus. James E. Bushnell, North Plainfield, N. J., assignor to Ransome Concrete Machinery Co., Plainfield, N. J. No. 1,754,815.

Sub-grade preparing, concrete distributing, and finishing machine. Philip A. Koehring, Milwaukee, Wis., assignor to Koehring Co., same place. No. 1,755,653.

Crushing

Gyratory crusher. Joseph E. Kennedy, New York, N. Y. No. 1,754,895.

Excavating

Excavating dipper. Berlin S. Ferguson, Marion, O., assignor to Marion Steam Shovel Co., same place. No. 1,755,438.

Excavator. George H. Greiman, Garner, Iowa. No. 1,754,551.

Mining machine. Herbert A. Buehler, Chicago, Ill., assignor to Goodman Mfg. Co., same place. No. 1,754,304.

Mining machine. Frank A. Lindgren, Western Heights, Ill., assignor to Goodman Mfg. Co., Chicago, Ill. No. 1,754,328.

Mining machine. Frank A. Lindgren, Western Heights, Ill., assignor to Goodman Mfg. Co., Chicago, Ill. No. 1,754,329.

Pneumatic excavator and conveyor. Henry A. Frohm, Aetna, Ind. No. 1,754,507.

Material-Handling

Loading machine. Nils D. Levin, Columbus, O., assignor to Jeffrey Mfg. Co., same place. No. 1,754,276.

Plaster Products

Plaster-wallboard construction. Oliver M. Knode, Winnetka, Ill., assignor to United States Gypsum Co., Chicago, Ill. No. 1,754,429.

Pulverizing

Method of mechanism for grinding and separating materials. Walter J. Clement, Utica, N. Y., assignor to Bossert Corporation, same place. No. 1,755,573.

Pendulum roll mill. Frank L. Buchanan, Los Angeles, Calif. No. 1,754,414.

FOREIGN

Burning

Burner for firing finely-divided fuel. N. B. Carbo-Union Industrie Maatschappij. German 496,468.

Heat economizer. Babcock & Wilcox and Goldie-McCulloch, Ltd. Canadian 299,097.

Mechanical regulator for pulverized-coal firing. Siemens-Schuckertwerke Akt.-Ges. German 496,576.

Pulverized-coal firing, in which the flame passes through a filter. Kurt Kuenzel. German 496,435.

Pulverized-fuel burner. Babcock & Wilcox and Goldie-McCulloch, Ltd. Canadian 299,101.

Tunnel kiln. Keramische Industrie-Bedarfs Akt.-Ges. German 496,391.

Crushing and Grinding

Apparatus for pulverizing various materials. La Realisation Mecanique. German 496,287.

Charging regulator for disintegrating and like mills and other apparatus. Hartstoff-Metall Akt.-Ges. (Hametag). British 303,032.

Colloid mill with concentric, cylindrical or slightly conical grinding elements. Chemicolloid Laboratories, Inc. German 496,542.

Concave jaws for crushers. R. P. Blavet. French 683,852.

Drilling

Compensator for rotary drill. F. Bade. French 683,848.

Distributive device for drills. Ingersoll-Rand Co. French 683,929.

Drill-sharpening machine. Sullivan Machinery Co. German 496,411.

Hammer drill for mining and similar operations. Dietrich Hesse. German 496,234.

Improvements in pneumatic drill equipment. Societe Anonyme Ateliers des Murezux. French 683,776.

Rock drill. Societe Siemens-Schuckertwerke Akt.-Ges. French 683,956.

Rock drills. Ingersoll-Rand Co. British 312,038.

Stone drill. Ingersoll-Rand Co. German 496,524.

Excavating

Apparatus for excavating. Peter Hoffmann. German 496,630.

Grab bucket. D. J. Barnard. French 683,918.

Grab bucket. Kurt J. Manning. German 496,629.

Gypsum

Improvements in gypsum tiles. W. Makovski. French 683,490.

New process for manufacture of plasters from anhydrite. V. Lefebure. French 683,681.

Material-Handling

Apparatus for conveying concrete. Carl Allertz. German 496,300.

Car dumper. J. Pohlig Akt.-Ges. German 496,706.

Conveyor control mechanism. American Sheet & Tin Plate Co. Canadian 299,085.

Driving mechanism for reciprocating conveyor of the trough type, screens and the like. J. Meredith. British 327,070.

Dump cars, ropeway buckets and the like. J. W. White. British 326,903.

Improvements in pneumatic conveyors for solid materials. Sturtevant Engineering Co. French 683,398.

Loading device. Foerster'sche Maschines, und Armaturen Fabrick Akt.-Ges. German 496,628.

Pneumatic transport of materials. Deutsch Evaporator Akt.-Ges. French 683,930.

Safety device for elevating machinery. P. Servais. French 683,601.

Storage and reclaiming apparatus for bulk materials. A. E. White (Robins Conveying Belt Co.) British 326,885.

Mixers

Apparatus for concrete mixer. Frederick James Wood and John Luck. German 496,302.

Mixing machine. John Fowler & Co., Ltd., and Charles Henry Fowler. German 496,301.

Mixing machines. V. Booth. British 326,969.

Mixing machines. A. Wallace and W. M. Wallace, Jr. British 327,000.

Screens and Separators

Automatically-cleaned screen. The Dorr Co. French 684,148.

Cleaning device for screen cloths. Societe d'Exploitation de Procedes et Brevets Industriels. French 683,899.

Magnetic separator. Fried. Krupp Grusonwerke Akt.-Ges. German 496,212.

Magnetic separators. Societe Industrielle de Matieres Electromagnetiques. French 683,827 and 683,828.

Magnetic separation of materials. Fried. Krupp Grusonwerk Akt.-Ges. British 303,513.

Miscellaneous

Coolers for rotary furnaces. N. Young. British 327,017.

Manufacture of artificial marble. J. J. Burke. French 684,077.

Producing an explosive. M. Hahn and M. Wolf. British 326,974.

Rotary dryer. Deutsche Babcock & Wilcox Dampfkessel-Werke Akt.-Ges. German 496,231.

PIT AND QUARRY *will furnish, at its actual cost, a copy of any patent cited above. A charge of ten cents per copy is made by the U. S. Patent Office, Washington, D. C., and readers may procure a copy directly by addressing the Commissioner of Patents, with payment for copies requested. Postage stamps are not accepted by the Patent office. We will endeavor to obtain copies of foreign patents for our readers but we cannot give assurance in every case for the reason that copies of such patents are not printed for distribution as liberally as are the American copies, nor is there a fixed charge per copy.*

Manufacturers' Publications

Each publication listed below contains information of interest to non-metallic mineral producers. Readers may obtain, without charge—except where a price may be stated—and without obligation, copies of any of these publications by writing directly to the manufacturers who publish them. Please mention PIT AND QUARRY *when writing.*

Cars, Quarry

Quarry Cars, 48 p., 102 ill. (Bulletin 210, Easton Car & Construction Co., Easton, Pa.) Describes and illustrates a wide variety of quarry cars, in which car types are standardized for each particular purpose. Truck and trailer transportation for quaries is also included.

Conveyors, Belt

"Moving Seattle's Mountains into the Sea." 5 p., 7 ill. (*Link-Belt News*, March, 1930. Link-Belt Co., Chicago, Ill.) Describes and illustrates the use of long belt conveyors in an extensive earth-moving project at Seattle, Wash.

Cranes

Crane Service News. 4 p. (Crane Service Assn., Lorain, O.) An illustrated tabloid printed in rotogravure picturing the use of various types of cranes in every possible use.

Crushers

Superior McCully Fine Reduction Gyratory Crushers. 16 p., 21 ill. (Bulletin 1461-B. Allis-Chalmers Manufacturing Co., Milwaukee, Wis.) Describes and illustrates the construction details of one of the most popular types of reduction equipment.

Dredges

Hydraulic Dredge Embodies Unique Portability Developments in Design and Construction. 4 p., 5 ill. (Bulletin P3. American Manganese Steel Co., Chicago Heights, Ill.) Describes and illustrates how the Columbus Gravel Co., of Columbus, Miss., created a new and highly efficient design of a dredge boat.

Drilling

Cleveland Hammer Drills. 12 p., 6 ill. (Bulletin 4463. The Cleveland Rock Drill Co., Cleveland, O.) Describes and illustrates hammer drills made in wet and dry types and gives specifications and recommendations for use.

"You Can Cut Your Drilling Costs." 2 p., 2 ill. (*The Armstrong Driller*, April, 1930. Armstrong Manufacturing Co., Waterloo, Ia.) Describes how one company saved $2,000 per month by using eight drills instead of fifteen.

First-Aid Equipment

B-D Safety Service. 32 p., 58 ill. (Catalog No. 2. Bullard-Davis, Inc., New York, N. Y. and San Francisco, Cal.) Describes and illustrates first-aid kits and safety items required in modern industrial operations.

Heating Equipment

G-E Industrial Heating Devices. 12 p., 12 ill. (General Electric Co., Schenectady, N. Y.) Describes and illustrates various pieces of electric heating equipment for use in plants.

Pumps, Centrifugal

Centrifugal Pump Accessories. (Bulletins 501, 505, 509, 512, 515, 520, 522 and 601 bound in an attractive cover. Barrett, Haentjens & Co., Hazelton, Pa.) Describe and illustrate various accessories for centrifugal pumps, particularly primers, and give approved methods of laying out pipe and fittings and proper placing of pumps.

Scrapers

"Scrapers Handle Stone and Sand in Large Material Yard." 2 p., 3 ill. (*Sauerman News* for March, 1930. Sauerman Bros., Inc., Chicago, Ill.) Describes and illustrates the pit and plant operations in connection with the building of the new Hudson River bridge between Fort Lee, N. J., and Fort Washington, N. Y.

Screens, Laboratory

The Weston Testing Screen. 4 p., 5 ill. (Hendrick Manufacturing Co., Carbondale, Pa.) Describes and illustrates a testing screen for coarse and medium-fine materials, showing construction, assembly and operation.

Screens, Vibrating

The Good Roads Vibrating Screen. 4 p., 7 ill. (Bulletin KVS. The Good Roads Machinery Co., Inc., Frankfort, Ky.) Describes and illustrates a vibrating screen of the positive eccentric-throw type in both single and double deck, giving specifications.

Welding

Arc Welding in Industry. 40 p., 62 ill. (General Electric Co., Schenectady, N. Y.) Describes and illustrates, in a comprehensive manner, equipment for and methods of arc-welding in present-day industry.

Fuel Equipment

The Jones & Hartman System of Preparing and Firing Pulverized Fuels. 16 p., 11 ill. (Bulletin No. 2, Jones & Hartman, Inc., Canton, O.) Describes and illustrates (giving specifications and general data) a dryer, ball-mill pulverizer and a powdered-coal feeder and shows these units used in combination in an actual installation for preparing and firing pulverized coal.

Coming Events

May 12, 1930. Cleveland, O. Meeting, Steel Founders' Society of America. G. P. Rogers, managing director, 932 Graybar Bldg., New York, N. Y.

May 15, 1930. Washington, D. C. Annual meeting, American Road Builders' Assn., at 914 National Press Bldg. Chas. M. Upham, engineer-director, same address.

May 19-20, 1930. White Sulphur Springs, W. Va. Annual meeting, American Refractories Institute. Dorothy Texter, secretary, Oliver Bldg., Pittsburgh, Pa.

May 29, 1930. Easton, Pa. Portland Cement Association regional safety meeting, at Hotel Easton. A. J. R. Curtis, secretary, 33 W. Grand Ave., Chicago, Ill.

June 3-4, 1930. Chicago, Ill. National Lime Association annual convention at Edgewater Beach Hotel. W. V. Brumbaugh, assistant secretary, 927 Fifteenth St., Washington, D. C.

June 9-12, 1930. Colorado Springs, Colo. Sixth annual convention, National Fertilizer Association at Broadmoor Hotel. Charles J. Brand, secretary, 616 Investment Bldg., Washington, D. C.

June 16-25, 1930. Berlin, Germany. World Power Conference. World Power Conference Program Committee, Room 818, 29 W. 39th St., New York, N. Y.

June 23-27, 1930. Atlantic City, N. J. Annual Meeting, American Society for Testing Materials.

June 24, 1930. Cleveland, O. Portland Cement Association regional safety meeting, at Hotel Cleveland. A. J. R. Curtis, secretary, 33 W. Grand Ave., Chicago, Ill.

June 26, 1930. Washington, D. C. Portland Cement Association regional safety meeting, at Hotel Raleigh. A. J. R. Curtis, secretary, 33 W. Grand Ave., Chicago, Ill.

July 1, 1930. Detroit, Mich. Portland Cement Association regional safety meeting, at Book-Cadillac Hotel. A. J. R. Curtis, secretary, 33 W. Grand Ave., Chicago, Ill.

Sept. 9, 1930. Seattle, Wash. Portland Cement Association regional safety meeting, at New Washington Hotel. A. J. R. Curtis secretary, 33 W. Grand Ave., Chicago, Ill.

Sept. 16, 1930. San Francisco, Cal. Portland Cement Association regional safety meeting, at St. Francis Hotel. A. J. R. Curtis, secretary, 33 W. Grand Ave., Chicago, Ill.

Oct. 6, 1930. Washington, D. C. Sixth International Road Congress under auspices American Road Builders' Assn. Charles Upham, engineer-director, National Press Bldg., Washington, D. C.

Los Angeles Materials Producer Expands Stocks

Several important additions to its warehousing and service facilities have just been completed by Consolidated Rock Products Co., of Los Angeles, Cal., as a result of a new policy of carrying a much wider line of builders' supplies than formerly.

While in the past the company has restricted business to the production and sale of washed sand, rock and gravel, it has now added cement, plaster and masons' supplies to permanent stocks. This is in line with the company's desire to be of greatest service to the construction industry, according to Walter Moore, Jr., sales manager.

This expansion of stocks has necessitated establishment of warehouses for the new lines at several strategic points in Los Angeles and suburban towns.

The Consolidated Rock Products Co. was recently formed through the consolidation of several of the largest rock, sand and gravel producers in southern California. This company is reputed to sell 95 per cent of all rock and gravel produced in this area.

Use Trucks and Dynamite to Wreck Brewery Silos

Four huge concrete silos—113 ft. high, 20 ft. across, half a foot thick, heavily reinforced and weighing thousands of tons—not worth their space in the world because the conversion of barley into beer is no longer a legally above-board process, were dynamited and then pulled to the ground with motor trucks recently at St. Louis.

Progress decreed that the 32-year old grain storage bins and brewery buildings must come down to make room for new and modern buildings. Recognizing the job as the "largest of its kind ever tackled west of the Mississippi," the Morrison Construction Co., general contractors, let the wrecking to the Pittsburgh Salamander Co., blasting specialists.

Regular concrete "busters" being ineffective, the silos and penthouse were cut apart from top to bottom by successive small blasts. Owing to a highly-populated and built-up neighborhood, heavy charges were out of the question, so a steel cable was placed around two of them, connected to three heavy-duty Sterling trucks equipped with Wood dump bodies and loaded with brick to increase traction. At the given signal a charge of dynamite was set off to weaken the foundation and the trucks simultaneously pulled the mammoth silos to their doom. The other two silos were demolished in the same manner. This means of operation not only saved

Preparing to pull down the silos.

considerable time, but eliminated the danger of heavier blasts.

The trucks were owned by Joe Gilliam, a St. Louis contractor-hauler, who stated that the heavy pull did not wrench the frames or bodies of his trucks, which were later used in clearing up the refuse and which was accomplished in a remarkably short time.

Screen Maker Appoints Regional Sales Manager

The Productive Equipment Corp., manufacturers of the Jigger vibrating screen, with headquarters in Chicago, announces the appointment of P. J. Hamilton, 749 Leader Bldg., Cleveland, O., as regional sales manager in charge of sales in Ohio, Pennsylvania and western New York. Before becoming associated with the Productive Equipment Corp., Mr. Hamilton had been with the Chicago Pneumatic Tool Co. for fifteen years, serving as manager of the latter company's Cleveland plant for a number of years.

Bailey Meter Co. Moves Chicago Office Location

The Bailey Meter Co., Cleveland, O., announces that it has transferred its office in Chicago to 20 North Wacker Drive. R. V. Knapp continues as branch manager in this territory where he is assisted by a staff of mechanical engineers specializing in metering control and combustion problems.

A Correction

Through the courtesy of W. R. France, president, we are able to revise a news item concerning the American Stone Corp., which appeared in our last issue. This company has purchased a 28-acre tract of quarry land just northeast of Lima, O., upon which it has erected a thoroughly modern, electrically-equipped plant. It did not move the plant from the old quarry.

Seek Employees' Advice on Waste Elimination

As a means of stimulating active interest of industrial workers in the problem of waste elimination, the advisory board of the National Industrial Equipment Exposition is sponsoring a competition for the best suggestion or idea for waste elimination advanced by an employee. The awards will be in the nature of two prizes: a cash award of $50 to the employee submitting the best letter on the subject, and a certificate to the plant where he is employed.

The suggestions must be in the hands of the award committee by midnight of May 30 and are to be mailed to the National Industrial Equipment Exposition, 308 West Washington St., Chicago, Ill.

The basis of the award will be on the practical use of the suggestion to American industry and the quality of the suggestion. Any company is eligible to send in three suggestions from employees for consideration. Each suggestion should be covered in an article of not more than 300 words.

The committee to decide the winner consists of James D. Cunningham, past president of the Illinois Manufacturers Association and head of the Republic Flow Meters Co.; John Carmody, editor of *Factory and Industrial Management* and president of the Society of Industrial Engineers; and C. B. Auel, chairman of the committee of waste elimination of the American Society of Mechanical Engineers and manager of employees' service, Westinghouse Electric and Manufacturing Co.

Nazareth Cement Seeks Safety Trophy in 1930

The Nazareth Cement Co. is a strong booster for safety practice, according to a statement by L. R. Rice, safety engineer for this company. On March 13, he wrote: "We have gone 330 days without a lost-time accident and we are making every effort to complete 1930 and win a trophy. We are centering our efforts on the working man, by bringing the safety thought direct to him. A careful physical examination of each employee is planned, to make him better fitted for the job. General mass meetings, foremen's dinner meetings, employees' general safety meetings and first-aid meetings are regular features of our monthly safety program."

Link-Belt Appoints New Distributor at Boise, Ida.

The Link-Belt Co., Chicago, has announced the appointment of the Idaho Equipment Co., 118 Main St., Boise, Idaho, as its agent, handling their complete line of cranes, shovels, draglines.

Financial News

The information contained in these financial pages is given with the understanding that any statement on the part of this magazine or any of its staff, as to the responsibility or standing of any person, firm or corporation, or as to the value of any property or securities is a mere expression of opinion, given as a matter of service to the readers of PIT AND QUARRY, *for which no responsibility in any way is to attach to this magazine or to any of its staff.*

Earnings of Monolith Cement Show Decrease

The report of Monolith Portland Cement Co. for the year ended December 31, 1929, just received from Los Angeles, shows a profit, before interest charges and federal income taxes, of $309,761, compared with $442,353 for the previous year. Net sales for the period were $2,421,000 compared with $2,630,000 in 1928.

Decrease in earnings is attributed by company officials to depressed conditions in the building in 1929 and also to the fact that the price of cement for that year showed an average decrease of 40½ per cent.

The company reports that during the last six months of 1929, its plant at Tehachapi was rebuilt, and as a consequence present production is more uniform and the operating cost lower. In effecting these improvements it was necessary to close the plant temporarily, thus affecting earnings for the year.

Kentucky Rock Asphalt Earnings Show Decline

The report of the Kentucky Rock Asphalt Co., engaged in quarrying, crushing and selling natural rock asphalt under the trade name of "Kyrock," has recently been received and shows net income of $281,204 for the year ended December 31, 1929. This is equivalent to $1.50 a common share and compares with net of $325,918 or $2.16 per share of common in 1928.

Regular quarterly dividends of $1.75 on the preferred shares have been maintained. On the common quarterly, dividends of 40 cents have been paid regularly to date since April 1, 1929, when the rate was increased from 25 cents. A 5-per cent stock dividend also was paid April 15, 1929.

The balance sheet as of December 31, 1929, showed current assets of $901,492, against current liabilities of $138,442, indicating net working capital of $763,050.

A total book value of $3,638,419 applicable to the 126,793 no-par common shares, or $28.69 per share, was also shown. This compares with $31.75 per share based on 108,873 shares on December 31, 1928.

International Earnings Lower in First Quarter

International Cement Corp. reports for the quarter ended March 31, 1930, net income of $841,480 after depreciation, federal taxes, etc., equivalent to $1.34 a share on 628,883 no-par shares of common stock. This compares with $1,017,619 or $1.64 a share on 618,924 common shares in the first quarter of 1929.

The income account for the quarter ended March 31, 1930, compares with 1929 as follows:

	1930	1929
Gross sales	$7,239,744	$7,491,036
Exp., etc.	5,506,287	5,630,821
Deprec.	491,037	446,369
Total inc.	$1,242,420	$1,413,846
Fed. tax, int., etc.	400,940	396,227
Net income	$ 841,480	$1,017,619

Johns-Manville Sales Reflect Definite Slump

Earnings of Johns-Manville Corp. showed a rather sharp slump in the first three months of this year. Net profit of $741,630 was equal after preferred dividends to 81 cents a share on 750,000 shares of common or 6 cents above quarterly dividend requirements.

The quarter just ended was the leanest since Johns-Manville entered its period of large earnings in 1928 and 1929. In the first quarter of last year the net was $1,106,089 or $1.30 a common share. Decline in earnings began in the fourth quarter of last year, for the net then amounted to only $1.25 a common share whereas earlier estimates had been close to double that figure.

Fundamentally two factors are responsible for the current recessions in earning power. The first is the extensive readjustment in the corporation's management and business still under way, and the second is the general business situation.

During the past two years management and operating methods have been greatly reorganized, and during the past year or more the business has been materially enlarged by acquisition of new products to fill out the Johns-Manville line. The latter problems require some time for solution. Operating costs are relatively higher than a year ago, as the many new units are being welded into the organization.

Alpha Portland Cement Earns $2.13 Per Share

Alpha Portland Cement Co. reports for 12 months ended March 31, 1930, net income of $1,654,098 after depreciation and federal taxes, equivalent, after 7 per cent preferred dividend requirements, to $2.13 a share on 711,000 no par shares of common stock.

Consolidated income account for 12 months ended March 31, 1930, follows: Net sales $11,183,880; operating expenses $8,279,150; operating profit $2,904,730; other income net $281,865; total income $3,186,595; depreciation $1,307,497; federal taxes $225,000; net income $1,654,098; preferred dividends $140,000; common dividends $2,133,000; deficit $618,902.

CURRENT DIVIDENDS

COMPANY	CLASS OF STOCK	DIVIDEND RATE	HOLDERS OF RECORD	PAYABLE
Alpha Portland Cement	Preferred	1¾% qr.	June 1	June 15
American Brick Co.	Preferred	$.50 qr.	Apr. 25	May 1
Bessemer Limestone and Cement	Class A	$.75 qr.	Apr. 19	May 1
Canada Paving and Supply.	1st Pfd.	1¾% qr.	May 15	June 1
Cleveland Stone Quarries	Common	$.75 qr.	May 15	June 1
Consolidated Sand and Gravel	Preferred	1¾% qr.	Apr. 30	May 15
Construction Materials	Preferred	$.87½ qr.	Apr. 24	May 1
General Asphalt	Preferred	1¼% qr.	May 15	June 1
General Asphalt	Common	$1.00 qr.	May 28	June 15
General Refractories	Common	$.75 qr.	May 12	May 26
Indiana Limestone	Preferred	1¾% qr.	May 20	June 1
Kentucky Consolidated Stone	Preferred	1¾% qr.	Apr. 15	May 1
Kentucky Rock Asphalt	Preferred	1¾% qr.	May 15	June 3
Lehigh Portland Cement	Common	$.62½ qr.	Apr. 14	May 1
Missouri Portland Cement	.....	$.50 qr.	Apr. 19	May 1
Material Service Corp.	.....	$.50 qr.	May 15	June 1
Metropolitan Paving Brick.	Common	$.50 qr.	May 15	June 1
Pacific Clay Products	.....	$.60 qr.	Apr. 20	May 1
Riverside Cement	1st Pfd.	$1.50 qr.	Apr. 15	May 1
Riverside Cement	Class A	$.31¼ qr.	Apr. 15	May 1
Raymond Concrete Pile	Preferred	$.75 qr.	Apr. 20	May 1
Raymond Concrete Pile	Common	$1.00 qr.	Apr. 20	May 1
Standard Paving and Materials, Ltd.	Preferred	1¾% qr.	May 2	May 15
Standard Paving and Materials, Ltd.	Common	$.50 qr.	May 2	May 15
Superior Portland Cement	Class A	$.27½ M.	May 23	June 1
Virginia Carolina Chemical.	Pr. Pfd.	1¾% qr.	May 17	June 1
Wolverine Portland Cement	.....	$.15 qr.	May 5	May 15
Worcester Salt Co.	Preferred	1½% qr.	May 10	May 15

Legal Information for Operators

Father's Liability for Contracts Made by Son

It is well settled in law that a father is no more liable for agreements made by his son than he is for contracts made by strangers, unless he places his son in a position whereby persons are led to believe that the father intends that the son transact business for him.

For example, in Matthews & Co. v. Pehrson, 225 N. W. 921, it was disclosed that a father, when he left the city, placed the management of the business in care of his son. During the absence of the father the son made two written contracts for the purchase of material.

The father refused to assume the obligations, contending that the contracts were not binding, since he had not given his son authority to make valid contracts. However, the court held the contracts binding on the father, and explained that the law implies that an employer is responsible for obligations made by any person who is left in charge and as manager of the business.

Employee is Entitled to Compensation for Injury

The law is well established that an employer never is liable in damages for injuries sustained by employees, unless the testimony proves conclusively that the injury arose from the employment. Generally, it may be said that an injury "arises out of" an employment when there is a reasonable casual connection between the conditions under which the work is required to be performed, and the injury is received while the employee is thus engaged. In other words, an injury is received "in the course of" the employment when the workman is engaged at the work he is employed to perform or in some duty incidental to that work, or with the consent of his employer.

For illustration, in the leading case of Punches v. American Co., 216 Mich. 342, it was disclosed that an employee was hired to care for and feed a team of horses. He was in the habit with his employer's consent of driving the team home at night for his own convenience and of keeping them in his own barn. One morning, when driving to his employer's place of business to begin the day's work, he was seriously injured. The higher court held that he was acting in the scope of his employment and was entitled to compensation, because the employer had consented that he take the team to his own home at nights.

Another important case is Simonds v. Reigel, 165 Minn. 458. Here a teamster in a gravel pit, four miles from his home, left his team to be fed by another and went on a motor-truck loaded with gravel from the pit to his home and was killed near his home while attempting to get off the truck before the driver had stopped it. The court held the employee within the scope of the employment and entitled to compensation, because his foreman was aware that he intended to leave his own team at the pit and ride on the truck to his home to eat lunch.

Trade Custom Affects Meaning of a Contract

It is important to know that a written contract may be interpreted in view of an unusual trade custom well known to the contracting parties, whereby neither party is bound to fulfill the terms of the agreement strictly in accordance with its legal and technical meaning.

For instance, in Alabama Chemical Co. v. International Agricultural Corporation, 35 F. (2nd) 907, the litigation involved a contract for 24,000 tons of Florida land pebble phosphate rock, at a price of $4.75 per ton f.o.b. the seller's mines, based on its containing 68 per cent bone phosphate of lime. The purchaser rejected the shipment on the grounds that the rock did not contain 68 per cent bone of phosphate of lime.

Testimony was introduced showing that Florida land pebble phosphate rock contains a valuable constituent of commercial fertilizer known as phosphoric acid. In the natural state of the rock the phosphoric acid is not available as a plant food, but is made so available by treating the rock with sulphuric acid and thereby producing acid phosphate. The phosphoric acid contained in pebble phosphate is present chiefly in the form of bone phosphate of lime, though smaller percentages of that acid are also present in other combinations. It was shown by the undisputed evidence that in the phosphate industry these smaller combinations are universally considered the equivalent of bone phosphate of lime.

Therefore, the court held the buyer liable in damages for failure to accept and pay for the shipment, saying:

"The substitution of other forms of phosphoric acid of equal value as the form described in the contract as bone phosphate of lime was authorized by a well-known general custom of long standing in the phosphate industry was established by the undisputed testimony."

Motor-Truck Owner's Liability for Accident

It is well settled that a motor-truck owner is liable in damages for an injury negligently effected by operators of motor vehicles who are acting within the scope of the employment when the accident happens. Usually, an employer is not liable for an injury effected when the chauffeur is disobeying instructions, or when he is substantially deviating from the shortest route to his destination. However a slight or unimportant deviation does not relieve the employer from liability, because legally he is acting within the scope of the employment.

For illustration, in Embry v. Reserve Co., 124 So. 572, it was disclosed that a driver of a motor truck received instructions early in the morning by telephone to take the truck and get a load. He started to the destination, but decided to deviate from the shortest route. He stopped at his home for breakfast. While going from the garage to his home he carelessly ran over a child who was playing in the street.

The owner attempted to avoid liability on the contention that the driver was not acting within the scope of the employment when the accident occurred and, also, that the parents of the injured child were negligent in permitting the child to play in the street. However, the Court held the owner liable, stating the following important law:

"We are of the opinion that, at the time of the accident, the driver of the truck was acting in the scope of his employment. His day's work had already begun by his supplying the motor of the truck with water and oil and gas and taking the truck out of its storage garage and receiving instructions from his employer what the day's work was to be. . . . The fact that before going to the Lee Hardware Company's warehouse, to get the load of dynamite that he was instructed to get, he decided to go to his home and get his breakfast, and was on his way there to do so . . . does not, we think, alter the fact that he was in the scope of his duty to his employer. . . . Neither do we think plaintiff was negligent in permitting the child to play, unattended, in a public street. . . . Parents are not obliged to restrain their children within doors at their peril, and the fact that a child five years old had strayed more than two blocks from home, at play with other children, is not of itself evidence of contributory negligence on the part of the parents."

Insurance Problems Discussed

Business Interruption

Business men are now pretty well aware of the fact that two different kinds of losses follow in the wake of a fire. As we pointed out in our last issue, not only is there the destruction of physical property, but equally real is the loss of income during the months required to rebuild and get into business again. This loss of income can be insured under a special form of fire insurance policy called business-interruption insurance or "use and occupancy."

The best way to understand business-interruption insurance is to apply it in imagination to your own plant. Suppose fire should destroy your property. It would take you several months to get back into operation. During the shutdown you would lose the income necessary to meet the following obligations:

What Policy Covers

Net profits. Your stockholders have invested money in your enterprise with the expectation that dividends will be continuous. Some of them—widows, retired men, heads of families—may be absolutely dependent on the regular dividend check for support. Company officers hold this investment in trust and owe their stockholders a moral duty to prevent fluctuations in earnings. Insurance offers a way to keep dividends constant regardless of fire or other casualty.

Taxes, especially the federal income tax and local real estate tax. When fire comes and the profits cease, it would seem reasonable that taxes should be reduced proportionately. So they are, in the long run. But taxes are almost always payable a year after they are incurred. The taxes you pay in 1930 are based on your earnings and property in 1929. Therefore you must have cash to meet current tax bills.

Salaries and Wages

Executives' salaries. The managers or officers and their families must live. If you expect your executives to give their whole-hearted energy to the trying work of rebuilding your plant after a fire, you should keep them free from worry about their own salaries. It is not fair to make the wives and children suffer.

Employees' wages. After a fire you would keep your office help, foremen, engineer and faithful old help in order to maintain the skeleton of your producing organization. You will pay them their full wages, but they will be doing only laborers' work, helping with your salvaging or rebuilding; and this payroll is a heavy load to carry for several months.

The foregoing items are universal. They represent a loss that is suffered by every plant that has a fire. There are other items which are very important in some cases, but which vary greatly according to the financial structure of the individual plant. Some of these are:

Although the cost of fire insurance of course stops as soon as a fire occurs, many insurance premiums continue just the same as if business were going on. You cannot afford to cancel your workmen's compensation, public liability or automobile insurance as long as your organization remains intact. If you are carrying business life insurance on your executives or group insurance you would not drop these during a temporary shutdown because they have a permanent value which should be maintained.

Keeping Good Will

Holding your customers' good will is one of the biggest and hardest jobs at such times. You want to convince your clients that you will be back in production in a hurry and keep them from going over to a competitor. To do this and to line up fresh orders, you must spend money for advertising, salesmen or entertaining, which ought to come from your insurance proceeds rather than out of capital.

Rent is an item which does not stop, even though logically one thinks it should. An office and maybe other temporary quarters must be maintained. Then, if you owned the property which burned, the fire deprives you of the use of your investment and this rental value should be covered by insurance.

And, finally, interest on bank loans, bonds or other debts must be met regularly and business-interruption insurance is the proper way to provide cash for these obligations.

Apply to Your Plant

Since emergencies or accidents may come in any business, it will be worth your while to pause at this point and apply each of the preceding paragraphs to your own organization. Take every item—profits, taxes or salaries, for example—and jot down in the margin of this page a figure for the money likely to be involved in each during 1930. Then add up the several items. This total will give you the amount of business-interruption insurance which you must carry, because the insurance policies cover an entire year even though you might normally be able to "get going again" in less time than that.

Now what does this business-interruption protection cost? Of course, no general answer can be accurate. Fire insurance rates vary widely according to the location, construction and occupancy of each building. The rate for business interruption is usually within twenty per cent of the regular fire insurance rate. Therefore you can make a reasonable estimate of cost by multiplying your possible year's loss by your regular building rate. For example, if your overhead and profits add up to $30,000 for the year and your fire insurance rate is $1.00 per hundred, the cost of business interruption insurance would be approximately as follows:

$30,000@1.00%=$300.

This figure is accurate enough to give you a notion as to whether you want to go into the question of cost more thoroughly.

Best Policy Form

There are two different types of policy form used in covering the risk of business interruption. The simpler and more common form names the maximum amount of insurance payable on each day. This amount varies from month to month, of course, because your earnings fluctuate according to the season. Such a policy might pay out for each business day

$ 50 per day in January
$ 75 per day in February
$150 per day in March

and so on. This form of policy is the cheapest. The only objection to it is that it requires an accurate guess about your earnings in each month of the year.

There is a broader policy called the *coinsurance form,* which does not have this limitation by months. Which policy fits your plant best and gives you the most protection for your money? This is an indiviual problem which must be analyzed by your own insurance broker.

Canadian Aggregate Firm Awards Plant Contracts

Canadian Aggregates, Ltd., of Toronto, Ont., has awarded contracts for the construction of a $200,000 plant at Burford, Ont. Awards were made as follows: Conveying equipment, Link-Belt, Ltd., Toronto; structural steel to Disher Steel Construction Co., Toronto; electrical equipment, Canadian Westinghouse Co., Ltd., Toronto, and Lincoln Electric Co., of Canada, Ltd., Toronto.

Review of Foreign Practice

Observations on Effect of Water in Aggregates

The moisture content of sand and gravel, and especially sand, has two important effects on concrete produced from it: (1) If sand containing water is used for making mortar without taking account of the moisture content, the result is that actually less sand enters into the mix than if figured and hence the mortar is "fatter," *i. e.*, it contains more cement in proportion to the amount of sand than was intended; (2) water contained in the sand and not accounted for may increase the water-cement factor by 50 per cent, or even more.

These phenomena have been noted in papers in American publications from time to time, and one writer records some European observations on this subject. According to this writer, the quantity of water that sand retains after being allowed to drain depends on the form, size and nature of the grains, and particularly shape and size, since the nature varies very little. The quantity of water retained is in proportion to the attraction of the particles, and the attractive force is in proportion to the surface area of the grains. Since the surface is greater as the size of particle is smaller, fine material has a greater attraction than coarse, and as the voids between grains are correspondingly smaller, the greater surface tension of smaller material acts on water more finely divided.

If the attraction of the granular surfaces is too small and the water not finely enough divided, the water can easily flow out when the material drains, and there remains only a small amount of water as a thin film on the grains. With finer material, however, the surface tension is great enough to retain the water in the voids between the grains, and the content of the "drained" sand may be considerable. There also results a "packing" of the sand grains because of the molecular action of the water

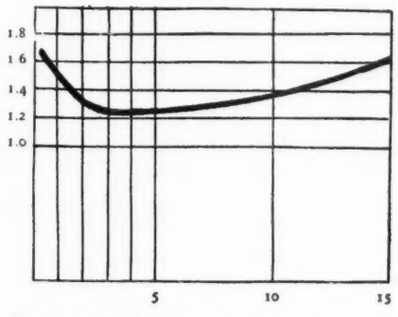


Fig. 1. Variations in kg. per liter (side) for different percentages of water (below) with Rhine sand.

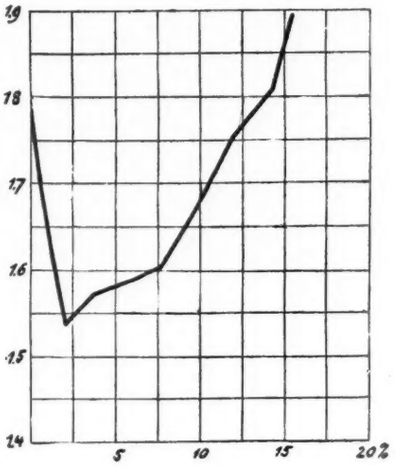


Fig. 2. Variation in kg. per liter (side) for different percentages of water (below) with masons' sand

between the grains, which tends to take on a form with a minimum exposed surface. This smallest surface of the water between the grains is attained when the grains are as close together as possible, so that the grains are drawn together tightly instead of falling freely apart as in the case of dry sand or sand inundated with water.

Since the ability of sand to retain water in this manner between the grains varies inversely with the size, there is a definite limit at which the surface tension is no longer great enough to retain the water. This could be determined exactly if the grains were perfectly spherical, and has been determined approximately for average sand, coinciding roughly with the limit between what is ordinarily considered sand and what is known as gravel. It is around 4 to 5 mm. (0.16-0.20 in.). The water so retained in fine dune sand is often around 26 per cent, in Meuse River sand (below 1 mm.) 24 per cent, and in river sand (from 2 to 3 mm.) about 20 per cent, as contrasted with about 3 per cent in coarse sand between 5 and 7 mm.

The writer discusses also the variation in specific weight of sand with varying percentages of moisture, his observations being much the same as those noted in previous publications here. Fig. 1 represents this variation in the case of Rhine sand, and Fig. 2 shows the same effect in what is commonly used as mason's sand; the figures in each case being for the specific weight in kilograms per liter. It is this variation in the unit weight of sand with varying water content that makes wet sand unreliable for proportioning by volume unless the moisture content is definitely known.

The effect that moisture held in the sand may have on the water-cement ratio is easily shown by a simple example. Concrete of 1:2:3 proportions by volume would contain in a certain batch 40 liters of cement, 80 liters of sand and 120 liters of gravel; if both the sand and the gravel contained 3.5 per cent of moisture, the water in these would amount to 10.5 liters. If the mixing water is 20 liters, the water-cement ratio is $\frac{30.5}{40} = 0.76$, as contrasted with an apparent value of $\frac{20}{40} = 0.5$ — a difference that can easily be still greater because of higher water content in the sand.—*Gewapend Beton*, Amsterdam, 18:6-8, Sept., 1929.

Tar-Macadam Preparation in French Road Building

Among the hydrocarbon materials used for coating road stone, tar has the big advantage that stone coated with it can be handled cold, and thus "tar-macadam" can be prepared in large quantities at central plants and at low cost. A logical place for the location of such central plants is at the place where the aggregate is prepared and in France, as in other countries, aggregate producers are installing tar-macadam plants in connection with their crushing and screening plants. The aggregate may be crushed stone, blast-furnace slag, gravel, or other appropriate materials. The tar-macadam is placed in one, two or three layers, usually two. The aggregates in the lower course are graded from 15 to 60 mm. (⅝ to 2½ in.), one-third lying between 15 and 30 and two-thirds between 30 and 60 mm. The upper layer is made with finer aggregates (6 to 15 mm., or about ¼ to ⅝ in.)

Manufacture of tar-macadam requires screening of the aggregates and mixing them in the desired volumetric proportions; drying of the aggregate to remove all trace of humidity, usually at a temperature between 80 and 100 deg. C.; heating the tar at a temperature usually from 130 to 150 deg. C.; exact proportioning of the materials (average of 45 to 50 kg. of tar per metric ton of 15-60 mm. aggregate, and 80 to 90 kg. of tar per ton of 6-15 mm. aggregate); and mixing the heated materials thoroughly in a machine similar to a concrete mixer, either intermittent or continuous. The author describes some of the machines on the market for this manufacturing process.—E. C. Blanc, *Pierres & Minerais* (Brussels) 1:5-7, Oct. 1929.

Traffic News and Comment

Plaster as Dunnage

Central Freight Association Docket No. 24,116 proposes to cancel the application of plaster rates now applicable on plaster in bags used as dunnage to protect shipments of gypsum blocks or tile. It is proposed to apply Rule 10 of Official Classification in lieu thereof.

Sand

A proposal to adjust per-ton rates on blast, core, engine, filter, fire or furnace, foundry, glass, grinding or polishing, loam, molding or silica sands, carloads, from Sandusky, Toledo and Canton, O., groups to various points in Kentucky and West Virginia is contained in C. F. A. Docket No. 24,578. Following are some of the changes proposed:

To	From Sandusky Group Present	Proposed
Coalton, O.	$1.50	$1.65
Cornelia, O.	1.80	1.65
Huntington, W. Va.	2.39	2.27
Riverton, Ky.	...	2.27
Wellston, O.	1.50	1.60

To	From Toledo Group Present	Proposed
Catlettsburg, Ky.	$2.10	$2.27
Cornelia, O.	...	1.50
Glen Jeau, O.	...	1.65
Guyandotte, W. Va.	...	2.27
Huntington, W. Va.	2.39	2.27
Kenova, W. Va.	2.10	2.27
Marietta, O.	1.80	1.60
Portsmouth, O.	1.60	1.65
Waverly, O.	1.80	1.65

To	From Canton Group Present	Proposed
Guyandotte, W. Va.	$2.02	$2.27
Huntington, W. Va.	2.02	2.27
Kenova, W. Va.	2.02	2.27
Riverton, Ky.	...	2.27

Talc or Soapstone

Southern Freight Association Submittal No. 50081 proposes rates on talc or soapstone, crude, ground, in bulk in bags, carload, 16 cents per 100 lb., minimum weight, 36,000 lb. from Birmingham, Ala., to Savanna, Ga. The present rate is sixth class 59 cents.

Central Freight Association Docket No. 23,507, covering Southern Freight Association Submittal 46,151 issued in 1929 was referred to in our issue of April 9th. There was proposed by the Southern Lines rates on soapstone and talc, c.l. minimum weight 50,000 lb. from Chatsworth, Canton, Cartersville and Jasper, Ga., and Kinsey, N. C., to Central Freight Association territory on the basis of rates from Marshall, N. C. The proposal was based upon the fact that the proportional rates from Chatsworth and Marshall to Cincinnati and Louisville are the same.

This subject was considered by the C. F. A. at its January meeting and, as it would result in shrinkage of C. F. A. lines earnings, it was not concurred in.

Silica

Southwestern Freight Bureau Docket No. 19,604 covers proposal to establish rates on silica, crushed or ground, from Rogers, Ark., in cents per 100 lb. minimum weight 90 per cent of marked capacity of car, except that when car is loaded to full visible capacity, actual weight will govern.

To	Rate
Oklahoma City, Okla.	12½c
Tulsa, Okla.	10c
Kansas City, Mo.	11c
St. Louis, Mo.	13½c
Chicago, Ill.	18½c
Cincinnati, O.	19½c

The basis for the proposed rates is 9½ per cent of first-class rates.

Cement

Southwestern Freight Association Docket No. 19,909 proposes establishment of rates on cement—hydraulic, Portland or natural—carload, from Longhorn and Cementville, Tex., to various points in Texas and Oklahoma, on the I. C. C. Docket No. 15,-151 basis, which now applies from Atco, Eagle Ford, Harrys and Fort Worth, Tex.

Pumicite

Docket No. A 247 proposes rates between points in the Southeast and points in the Southwest without restriction as to origin points on 12 per cent of first-class rate.

Agstone

A shipper's proposal to reduce rates on agricultural limestone, carload, minimum weight, as per Official Classification from Akron and Barberton, O., to destinations east of the western termini of eastern trunk lines is embodied in C. F. A. Docket No. 24,204. The present rate is on the basis of 25½ cents to New York, and the proposed rate is 22½ cents.

New Complaints Filed

No. 23,094. Uvalde Rock Asphalt Co. Attacks rates on asphalt rock, natural or coated, with not to exceed 5 per cent road oil, from Blewett and Cline, Tex., to points east of the Mississippi River and asks for just and reasonable rates not to exceed those prescribed in Docket No. 17,805 or such other rates as the Commission may find just and reasonable.

No. 23,316. Riverside Cement Co. Attacks rates on portland cement from Oro Grande and Crestmore, Cal., to destinations in Nevada and Utah. Asks for reasonable and properly related rates.

No. 23,332. Medusa Portland Cement Co. Attacks rates on portland cement from Bay Ridge, O., to York, Pa. Asks for reparation.

No. 23,335. Cumberland Cement & Supply Co. Attacks rates on sand and crushed stone from Stone Siding, Md., to points in Pennsylvania. Asks for reparation.

No. 23,340. F. E. Reed Glass Co. Attacks rates on glass sand from the Mapleton District in Pennsylvania to Rochester. Asks for new rates and reparation.

Decision Rendered

No. 22,039. Louisville Cement Co. Local rate to Louisville, Ky., charged on through shipments of cement in carloads, from Speeds, Ind., to destinations in Kentucky, Tennessee, and Virginia found inapplicable. Complaint dismissed.

Chain-Belt Moves Into Larger New York Office

Chain Belt Co., of Milwaukee, Wis., has moved its New York office into new and larger quarters. For a number of years the office was located at 50 Church St. The new quarters are in the new Chrysler Building, 405 Lexington Ave., New York, N. Y. W. H. Quinn is New York district manager.

Foote Bros. Names New Agents for Los Angeles

Foote Bros. Gear & Machine Co. announces the appointment of a new representative, Sutor & Co., 2008 East Slauson Ave., Los Angeles, Cal., for its IXL speed reducers and gear products. The Los Angeles territory extends from the southern boundary of California to a line drawn across the state just north of Bakersfield.

Electric Machinery Co. Moves to Opera Building

Electric Machinery Manufacturing Co. announces that, since April 1, 1930, its Chicago office has been in a new location—Room 1567, 20 North Wacker Drive (Civic Opera Building).

New Machinery and Supplies

Spray-Painting Outfits Are Driven from Engine

The Binks Manufacturing Co., Chicago, manufacturer of spray-painting equipment, announces two complete outfits, No. 222 and No. 333, and a new product—the Hu-Ro painting outfit.

These units operate from the air pressure of any auto, truck, or tractor without the use of an air compressor. The air-pressure valve is attached to any spark-plug opening, the motor is started and allowed to idle, producing a free passage of air on the downward stroke of the piston. The upward stroke compresses the air and forces

No. 222 paint-spraying outfit.

it through to the spray gun. The free passage of air on the downward stroke prevents all gases from reaching the cylinder, leaving the compressed air entirely free from gases and oils.

Outfit No. 222 is complete with No. 22 spray gun, air-pressure valve and 25 ft. of air hose. The spray gun has a cast-aluminum cup holder attached to a standard pint Mason jar.

The No. 333 outfit consists of the Binks No. 33 spray gun, pressure ma-

Outfit 333 for spraying all kinds of paint.

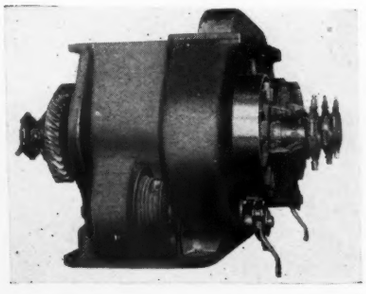
Special outfit for applying paints, varnishes and lacquers.

terial cup, two air-pressure valves and air hose. The materials are fed through the quart pressure cup to the spray gun, by air pressure, producing a flat, fan-shaped spray.

The Hu-Ro painting outfit is similar to the above but has two spark plug connections to the cylinders of the motor. It is a complete unit equipped with a container which accommodates a 5-gallon can of paint; a check valve on the container; 25 ft. of air hose; 25 ft. of material hose between the gun and container; has the Binks No. 33 spray gun attached to a quart size detachable pressure cup and the double valve hook-up furnished has 25 ft. of ⅜-in. air hose with "Y" connection and two 3-ft. lengths of hose with valve connections on each end.

Gear Unit Enclosed in Solid, Oil-Tight Case

The gears in a gear case recently brought out by the Universal Power Shovel Co., Milwaukee, Wis., are drop-



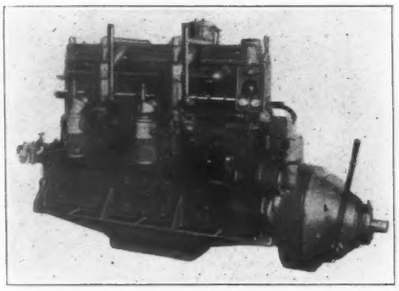
One-piece, oil-tight gear case.

forged, double heat-treated, and bored true to center. The casing itself is of one-piece construction and hence oil-tight, so that the gears operate continuously in an oil bath. The gears have ball bearings. This is known as Unit 512.

Permits Use of Low-Cost Fuels in Power Plants

The Climax Engineering Co. of Chicago and Clinton, Ia., announces that its line of Blue Streak engines is now provided with equipment making possible the use of fuel of 36 deg. to 40 deg. Baumé, and costing about half as much as gasoline. Mean effective pressures of 90 lb. per sq. in. with high power, flexibility and low fuel consumption are secured, comparing very favorably with those obtained from good gasoline-burning industrial engines of conventional design.

Equipment is the same as that employed on the gasoline-burning engine, with the addition of an oil rectifier,



Engine equipped to burn low-cost fuel oil.

a heat-control mechanism and a water supply for full-load operation.

To provide the flexibility necessary for the successful handling of the different loads and speeds encountered in the various industrial applications, the heat supplied to the fuel mixture is varied automatically with the load.

Unheated air is admitted to the mechanism body through the air cleaner shown in the illustration. Cleaners are also attached to the openings on the hot-air box, fully protecting the induction and manifold system from dirt and other foreign particles.

The sylphon is connected to the intake manifold by a copper tubing so that pressure changes caused by various loads imposed on the engine are transmitted to the sylphon, thus providing a motive power to operate a valve controlling the supply of heated or unheated air. This part is similar to the spark control mechanism used on Climax engines during the past two years, and is, therefore, a device which has been subjected to considerable field service and experience.

On demands for power exceeding three-quarter load, the movement of the sylphon opens a valve controlling the supply of water to the fuel mixture. The valve body may be seen mounted on the elbow connecting the hot-air conduit with the main body proper.

New Steel Drive Chain of Heat-Treated Alloy

Link-Belt Co., of Indianapolis, Ind., announces the development of a new steel drive chain which is to be known as Link-Belt Hyper chain. The chain is made from alloy steel, heat treated, and uses a new type of pin and cotter. The pins, bushings and holes in side bars are accurately ground. The cotters are of a special type and are so designed as not to work loose when once inserted and swelled into the holes provided in the pins for their reception.

Section of steel drive chain.

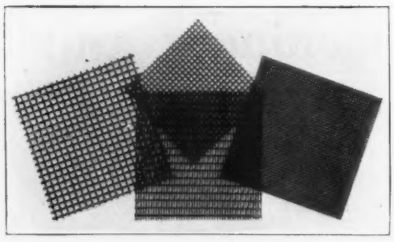
The new chain combines great strength with durability. The Hyper SS-40 chain has an ultimate strength of 75,000 lb. and the Link-Belt Hyper SS-124 chain, an ultimate strength of 150,000 lb.

The manufacturing tolerances to which Hyper parts are held are extremely fine—0.001 in.—which insures press fits of the highest order, and such fits result in a durable chain. The chain was developed to meet a growing need for a stronger and more durable type of chain for heavy positive power transmission.

Manganese Steel Wire Screens Have Fine Mesh

Of interest to users of screens for grading fine, abrasive materials is the announcement by the Manganese Steel Forge Co., Philadelphia, Pa., of the development of fine-mesh screen cloth made of drawn manganese-steel wire.

Rol-Man is a true manganese steel with an ultimate tensile strength of 140,000 to 160,000 lb. per sq. in., a shearing strength of 100,000 to 110,000 lb. per sq. in., and an elongation of 35 to 50 per cent in two inches. These physical properties are said to give it unusual wear-resisting qualities and extreme toughness and strength, as compared to commercial carbon steel, which has an ultimate tensile strength of 70,000 lb. per sq. in., a shearing strength of 50,000 lb. per sq. in., and an elongation of 30 per cent. The screens are woven with a double-crimp type of mesh, and the manufacturer states that the unusual strength of the drawn manganese-steel wire gives an exceptionally live and resilient screening surface that produces highly efficient and thorough screening action. Extended tests on various types of equipment show that the resiliency of this surface is maintained throughout the life of the screen.

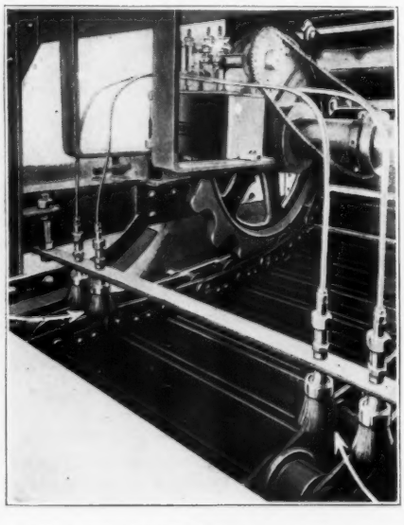


Fine-mesh, manganese steel screen.

Force-Feed Lubricator Solves Vexing Problem

Here is an interesting adaptation of a force-feed lubricator to a difficult oiling problem. The photograph shows how a large company assures positive lubrication of a heavy-duty apron conveyor used for carrying filled and empty drums.

The lubricator is mounted on the under or slack side of the conveyor.



Force-feed lubricator on apron conveyor.

Oil is forced by the pump to the brushes shown through ¼-in. o. d. copper tubing. As each link in the chain passes the brushes it is coated with a film of oil. The lubricator used on this installation, manufactured by the Hills-McCanna Co., Chicago, Ill., is a four-feed unit driven by a sprocket and chain from one of the main drive shafts.

This is but one of many applications of Hills-McCanna lubricators in supplying positive lubrication. Units are built in several sizes ranging from pint capacity single feed units for use on small equipment pumps and the like, to large units having as many as 60 feeds. These units may also be mounted in tandem fashion, operated by a central driving unit, thereby increasing the number of feeds to any desired quantity. These larger units permit lubrication of several related machines at regular intervals with predetermined amounts of oil.

Concrete Carrier Built With Cone-Shaped Body

The new design of a concrete carrier embodied in the equipment produced by the Parke Concrete Carriers, Inc., has created considerable interest and attention because of its simplicity and sturdiness of construction. This new carrier eliminates the hoist, a feature so common and expensive in other types of similar equipment. It introduces a cone-shaped revolving drum body, a distinctive gravity unloading feature. Another new feature is the two-way clutch control. This speeds up work on jobs where wheelbarrows must be employed. It lightens the weight of the carrier and permits it to be cleaned more easily.

New type of concrete carrier.

The Parke concrete carrier was developed by contractors who pioneered in the ready-mixed business. As a result of a year's experimenting, it was designed to overcome the practical troubles and needless operating expenses previously encountered with other type bodies used by them in the transportation of ready-mixed.

Cleaning of the carrier is simplified by the cone-shaped drum. It is cleaned by simply flushing the interior of the drum and revolving. This is done at the end of a day's work. Operating costs are further reduced because the carrier has one door in the rear of the drum for both loading and unloading.

Design Crawler Wheels of High Performance

Simplicity, durability and easy, smooth-running operation are outstanding qualities of the new Trackson crawler wheels which are the most recent product of the Trackson Co., Milwaukee, Wis. These wheels are designed for installation on wagons and trailers to meet the heavy hauling requirements of those who handle dirt, crushed rock, gravel or other materials. Pit and quarry operators, brick manufacturers, sand, gravel and crushed-stone companies, contractors and many others will find them the ideal equipment for their wagons, for no matter how bad the ground conditions or the weather, they can be depended upon to deliver their loads, at a profit.

The crawler wheels embody every principle and feature of construction that makes for profitable performance, low maintenance cost and long life. They are built of heavy alloy steel castings and drop forgings—and are well able to withstand the hard

Crawler-trend wheels designed for heavy hauling.

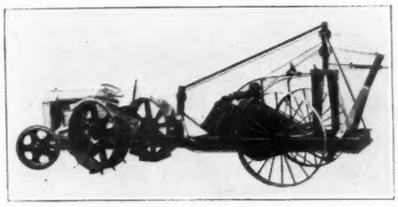
wear and the shocks and strains to which equipment of this kind is subject. Also, every part is generously proportioned to provide a wide margin of safety over the rated load capacities of the wheels.

Another distinctive feature is the take-up device which provides for tightening the track-shoe loop by varying the wheel centers to suit different operating conditions. Since the shoe loops should be neither too tight nor too loose for most efficient operation this take-up device is important. Also, it is especially effective because of its simplicity and accessibility.

Power Winch is Feature of New Wheeled Scraper

The new improved Fordson tractor with its increased power at both belt and drawbar of approximately 27½ percent over the former model offers, with the Miami improved roller-bearing wheeled-scraper, an earth-moving unit designed for both short and long haul work with greatly reduced yardage cost.

The scraper, produced by the Miami Trailer-Scraper Co., of Troy, O., operates on high roller-bearing wheels requiring but a minimum of drawbar power from the tractor, with the result that the tractor can, after loading, be shifted into high gear and the



Wheeled scraper with power winch.

load transported, dumped and returned in high speed of the tractor.

By reason of this high-speed operation under full load, the unit is an excellent earth mover at low yardage costs on hauls up to 1,000 or 1,200 ft. It cannot be stalled even under the most adverse conditions as the scraper bowl can be instantly raised by means of the power winch to pass over obstructions or instantly lowered for heavier cuts of materials. It can be dumped moving forward, in reverse motion or while stationary. It can be backed into any position for loading or dumping.

The scraper is an excellent unit for all types of grading with one man or the tractor driver. Distribution of this product has been arranged through regular Fordson tractor distributors and dealers.

Convertible Excavator Is Developed by Orton

Outstanding improvements in the design of small excavators are incorporated in the new Model 4 machine recently developed by the Orton Crane & Shovel Co., Chicago, Ill.

These improvements apply particularly to the speed and ease with which the new excavator can be handled while digging, hoisting, swinging or traveling. It is equipped with a 40-hp. four-cylinder gasoline engine which is provided with an accelerator arranged for both hand and foot operation, electric starter, oil filter, air cleaner and other modern accessories.

Power is transmitted by means of a multiple-disk clutch, the transmission shaft being mounted on anti-friction bearings. Connecting the transmission shaft to the propelling clutch shaft is an enclosed alloy-steel chain with floating take-up. By use of the engine clutch the double-jaw propelling clutches can be shifted as easily as a friction clutch of the gear type, and the traveling speed can be varied from ⅝ to 3 miles per hour.

This wide range gives high traveling speed for smooth road, together with great tractive effort for traveling on rough ground, it being possible to negotiate a 25-per cent grade. A special main cutout clutch enables the operator to stop all of the machinery except the propelling mechanism when traveling, a decided advantage when going any considerable distance.

The treads are of the self-cleaning type, and are driven by heat-treated alloy-steel bushed roller chains on large-diameter hardened sprockets, provision being made for take-up of both the treads and chains. Coil springs back up each set of treads, thus protecting the operating mechanism from undue strains and shocks, and distributing the weight of the machine uniformly on the shoes when traveling over uneven ground.

Steering is accomplished by a hand wheel in the cab, brakes being applied to either of the two differential shafts. The machine can be turned in a circle, the radius of which is equal to the center-to-center distance between the treads.

Extra heavy construction is a feature of the car body, which is electri-

A new convertible excavator.

cally welded throughout. No strains are imposed on the pivot post by the superstructure, and a special brake is provided so that the shovel is not forced away from the work when the dipper is being crowded.

Crawler Bucket Loader Has Spiral Self-Feeder

Link-Belt Co., Philadelphia, announces the development of a new high-capacity crawler bucket loader, which is to be known as "The Grizzly, 1930 Model"; and that, after having given the machine a thorough try-out under actual working conditions, they are going into production on a large scale.

Particular stress is laid on the construction of the self-feeder with which the loader is equipped. This new feeder is of the continuous helical ribbon type, which it has been proved feeds uniformly, and cleans up uniformly. The action of its self-sharpening spiral and correct cutting edge serves to cut, dig and convey the material to the elevator buckets in a smooth, continuous, uniform stream. There are no blows or shocks. The

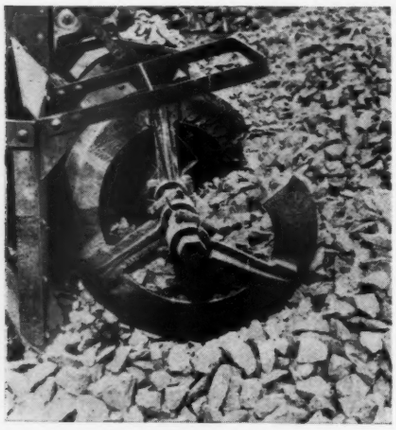
New crawler bucket loader.

feeder's adjustment is controlled by a hand-wheel within easy reach of the operator, who rides with the machine on a conveniently-located side platform.

The machine has a rated capacity of 1¾ cu. yd. per minute, based on handling sands, stone and gravel, 1½ in. and smaller; run-of-mine coal, coke, etc. Larger stone may be handled at a somewhat smaller capacity.

The power unit regularly includes a 30-hp. Buda gasoline engine, or a 20-hp. electric motor, for operating the bucket, elevator, feeder, and the crawler traveling mechanism.

The crawler frames are one-piece steel castings. The crawler is wide and long to give the machine ample



Self-feeder on crawler loader.

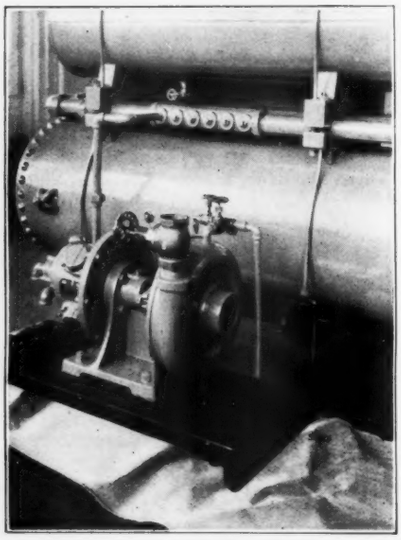
stability for grueling work to which such machines are customarily subjected. It is also said to be self-cleaning.

Air-Driven Pump Keeps Workings Free of Water

Ingersoll-Rand Co., New York, N. Y., has announced an air-motor-driven pump, known as the "ACV." The pump is a Cameron single-stage, single-suction, open-impeller, volute type and is driven by a 4-cylinder air motor. It can be mounted on a shelf at the rear of a portable air compressor. In this position, the connecting pipe between the air receiver and the motor will not interfere with the operation of the hose-line supplying air to the drills. Ample space is left on the shelf for a tool box, which does not hinder the operation of the pump.

The unit is positive in action, and will prove useful for de-watering trenches and excavations that have become filled overnight. It will also keep the workings free from water caused by surface drainage or seepage while the men are at work.

The capacity of the pump, with 60-lb. air pressure at 1,000 r.p.m., is



Air-driven motor direct-connected to pump.

130 g.p.m. against a 29-ft. head. With 80-lb. air pressure at 1,200 r.p.m., the capacity is 125 g.p.m. against a 43-ft. head. These figures are based on a 20-ft. suction lift.

Dryer Utilizes Radiated Heat from Rotary Kilns

The Jones & Hartman patented dryer is an entirely new form of dryer, designed to utilize the radiated heat from rotary kilns and coolers.

It consists of multiple compartments, attached around the kiln, parallel with it, and separated from the kiln by an air space of 3 in. to 6 in. through which air is circulated, heated and used for drying coal, limestone, shale, or clay.

The compartments are fitted with lifting angles which cascade the material through a current of heated air during each revolution of the kiln. A vent or stack is provided on the feed hood of the dryer to draw off the moisture and air. Feeding scoops are attached to each compartment on the high end of the dryer. These scoops place a constant quantity of material into each compartment at each revolution, making each compartment a complete dryer in itself. At the low end of the dryer, each compartment has a discharge opening.

The dryer is made of heavy boiler plate and in suitable sections to permit easy-handling and erection. It is furnished in capacities of from 1 ton to 6 tons of coal per hour. For descriptive bulletin, address Jones & Hartman, Inc., Canton, O.

New Corporations

Allen-Commings Sand & Gravel Corp., Ashtabula, Ohio. William E. Pfau, 710 First Nat. Bk. Bldg., Youngstown, Ohio. 250 shares n.p.v.

Service Sand & Gravel Co., 2915 E. 26th St., Cleveland, Ohio. J. F. Ferdinado, gen. mgr. 250 shares n.p.v.

Mishawaka Sand & Gravel Corp., Mishawaka, Ind. Fred W. Steinke, pres.; Phillip H. Matz, treas.; Leonard Zick, sec. 1,000 shares n.p.v.

Henderson Quarries, Inc., Raleigh, N. C. Thomas Wakeham, Henderson, N. C.; Hubert White and Morris A. Lobron, Philadelphia, Pa. $10,000 pfd.; 100 shares n.p.v.

National Stone Products, Inc., Northampton, Pa. J. C. Meighan, Northampton; J. Edward Shirk, treas., Laurys Sta., Pa. $10,000.

Lilly Firebrick Co., Lilly, Pa. James Toole, treas., Portage, Pa. $100,000. To mine fire clay and manufacture brick.

Somerset Trap Rock Corp., 113 Central Ave., Westfield, N. J. Chas. F. Lewis, Kimball Circle, Westfield, N. J.; Wm. H. Weldon, 417 S. Euclid Ave., Westfield, N. J.; Frank E. Weldon, Martine Ave., Fanwood, N. J.

Conemaugh Quarries, Inc., 1101 First Nat. Bk. Bldg., Johnstown, Pa. H. S. Endsley, sec.-treas.; H. B. Mainhart, pres.; Alfred Slater, vice-pres. Plant will be located in St. Clair Twsp., Westmoreland Co., Pa.

Kentucky-Tennessee Rock Asphalt Co., Nashville, Tenn. O. M. Long, Paul Huey, J. D. Langohr, John B. Struwe. $125,000.

Cumberland Stone Co., Crab Orchard, Tenn. Newton D. Walker, pres.-treas. J. R. Mitchell, vice-pres.; D. L. Hembrer, sec. $50,000. To produce crushed lime and sandstone, also building sandstone and flagstone.

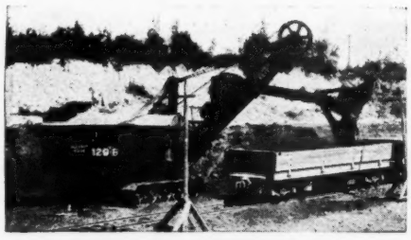
Crab Orchard Sand & Supply Co., Youngstown, Ohio. W. L. Countryman, Andrew Colucci, Ray L. Smith. $15,000.

Lithgow Sand & Gravel Corp., Lithgow, Millbrook P. O., N. Y. Pasquale Acceloro, Thomas Lorifice. $50,000. To operate sand and gravel pit.

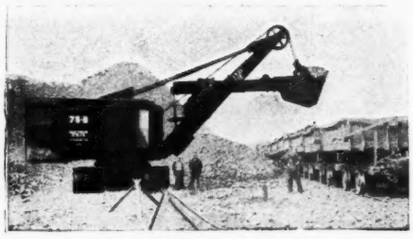
Port Logan Materials Corp., 1606 Toledo Trust Bldg., Toledo, Ohio. S. C. McKee, pres.; J. M. Jones, L. C. Baxter, Toledo, Ohio. Plant at Keeport, Logansport P. O., Ind.

100-B Electric shovel with 3-yard dipper at Lima Stone Company's Quarry, Lima, Ohio

WHICH WILL SERVE YOU BEST



120-B Electric shovel—4-yard dipper.



75-B Electric shovel—2½-yard dipper.

50-B Electric shovel—2-yard dipper.

Power shovels, clamshells, cranes, draglines, dragshovels,—½ to 16-yard capacity—electric, steam, gasoline, Diesel, gas+air, Diesel+air.

Dipper, hydraulic and placer mining dredges.

A-104—5-21-30 PQ

BUCYRUS ERIE

A Jack-of-all-trades Shovel—or One Especially for Mines and Quarries?

You know the answer. It pays to buy a real heavy duty shovel—one that's designed and built for your class of work . . . . By that we mean—not an adaptation of a general work-shovel, but a Bucyrus-Erie 2, 2½, 3, 4 or 5-yard machine based on long experience in meeting quarry or mine requirements. A shovel, built from the ground up to handle toughest digging at a speed that insures lowest unit output cost.

The fast digging cycle of these machines is speeding production in mines and quarries all over the world. They have a reputation for ease of control. They're ruggedly built for fast-speed production month after month with minimum time-loss and upkeep cost.

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